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Common Annexes

Including Corrigenda no.1 and 2

Red Ensign Group Yacht Code



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ANNEX A

BATTERY SYSTEMS GUIDANCE FOR INSTALLATION AND OPERATION

A1 - Summary

- (1) The intent of this Annex is to provide guidance on best practice to facilitate safe solutions for vessels utilising batteries used for propulsion and/or electric power supply purposes during ship operations.

A2 - Introduction

- (1) This guidance has been developed to identify industry best practice, however it is recognised that this guidance shall not cover every eventuality in design, installation, operation, etc, and each case shall be considered separately. There are several areas within a design where the use of risk assessments or hazard identification techniques (such as Failure Modes Effects Analysis (FMEA)) shall be performed to understand the potential safety issues for personnel, the environment, the vessel and the vessel's operations.
- (2) This guidance does not supersede any other guidance or statutory instruction and shall be taken into account when developing designs for battery power systems. This guidance does not replace the need for sound engineering practice nor seamanlike precautions.

A3 - Definitions

- (1) *A cell* is a single electrochemical unit in its simplest form, typically packaged in: metal cylinders; or flat, rectangular metal or plastic cases ("prismatic cells"); or heat-sealed foil pouches.
- (2) *A battery* is an assembly of two or more cells that are electrically connected together and fitted in a case with devices as terminals, markings and protective devices that it needs to function properly and safely.
- (3) *Thermal runaway* is when a cell enters a self-heating state (exothermic reaction) where the heat generated is greater than the heat dissipated. (Note: thermal runaway can begin at temperatures as low as 120°C depending on the cell size, design and chemistry, and from the initiation of thermal runaway, a cell's temperature can rise to a maximum in under 2 minutes.)
- (4) *State of charge* is the available capacity in a battery expressed as a percentage of rated capacity.
- (5) *State of health* reflects the general condition of a battery and its ability to deliver the specified performance compared with a new battery.

- (6) *A battery management system (BMS)* is an electronic device that controls, manages, detects or calculates electric and thermal functions of the battery system and provides communication between the battery system and upper level control systems.

A4 - General Overview

- (1) The contents of this guidance shall not cover every eventuality in design, installation, operation, etc, and each case shall be considered separately. The use of risk assessments or hazard identification techniques shall be performed to understand the potential safety issues for personnel, the environment, the vessel and the vessel's operations caused by the incorporation of a battery. Suitable mitigations or safeguards shall be implemented to reduce risks to an acceptable level. In general, amendments to operational methods or procedures shall not be accepted as an alternative to the safe design of a battery system and its installation in a vessel, whether this be regarding location, materials, equipment, auxiliaries, construction method, etc.
- (2) The design of a battery system within a vessel shall anticipate future changes. These changes might relate to the operational tasking of the vessel, modifications to the electrical equipment, upgrades to the battery cell chemistry (and energy density) or caused by obsolescence of equipment. It shall be highlighted that any modification which changes the requirements upon an existing battery system shall be thoroughly assessed against the original requirements of the battery and its current state of health.

A5 - Battery Installation in a Vessel

- (1) This section provides guidance to ensure that the hazards associated with installing and operating a battery on a vessel do not lead to unacceptable risks to persons, the vessel, the environment, or the vessel's operations. SOLAS II-1 Part D Electrical Installations shall take precedence over the following paragraphs however their content shall be considered.
- (2) The role of the battery shall be clearly defined for its intended use in a vessel; for example, the battery may be a small part of a hybrid system, or it may be the sole source of propulsive power. A risk assessment method such as an FMEA shall be performed to assess the effects of a battery system failure upon the vessel and its operations. These assessments shall consider the vessel's different operating modes and the state of health of the battery through its intended design life.
- (3) The vessel shall employ its own electrical protective devices (e.g. fuses or circuit breakers) to protect the battery and personnel but also to prevent damage to ships equipment caused by battery defects. A positive lockable means of isolating the battery shall be provided to allow maintenance.
- (4) The location of the battery compartment shall take into account the operational role of the battery (e.g. whether the battery is used for emergency power during an engine room fire) as well as the effects that a battery fire would have on the vessel. Consideration shall be given for avoiding adjacent compartments containing sources of heat or significant fire loads as increases in battery compartment temperature could

affect battery operations or lead to thermal runaway. It is expected that further considerations would be necessary for vessel not built of steel or equivalent material. A full assessment shall be made for the routing of cables and pipework through the battery compartment, and the routing of cables from the battery in order to maintain essential services during an incident.

- (5) It is strongly recommended that the temperature of the battery space/compartment is given strong consideration for all installations. To ensure that the batteries are kept within their thermal operating limits, temperature control systems like water cooling systems or heating, ventilation and air conditioning (HVAC) systems shall be employed with levels of redundancy to ensure that localised cell temperatures remain within manufacturers guidelines in the most onerous heating condition (e.g. high external atmospheric temperatures with all equipment operating at maximum load). The failure of such temperature control systems shall produce alarms for the battery system. Temperature monitoring of the battery compartment is also recommended and this may be linked to early warning alarms as well as fixed fire suppression systems.
- (6) All ventilation and electrical systems within the battery compartment shall be capable of being isolated from a safe location outside of the battery compartment. Ventilation systems shall safely expel toxic or flammable gases to a safe location.
- (7) The battery and battery systems shall be fixed within the battery compartment such that they can endure the maximum predicted vessel motions. Heavy items or items which could cause physical damage to the battery shall not be co-located with the battery unless these are retained within the same parameters. Consideration shall be given to fixing the battery adjacent to any potential heat source which could result in inadvertent heating of the battery, e.g. exhaust, heavily loaded electrical cabling and direct sunlight.
- (8) The battery location and fixings shall ensure that standing water and residues are removed from around the battery and fire-fighting mediums can adequately penetrate the battery casings to extinguish and/or quench a potential fire.
- (9) Consideration shall be given to the reduction of combustible materials within a battery compartment, especially those which produce smoke or toxic products in a fire. For certain types of vessel the use of combustible materials within the battery compartment may be prohibited. Dangerous goods shall not be stored in a battery compartment.
- (10) The boundaries of the battery compartment shall have fire protection to contain a fire in the space of origin and it shall be appropriate for the cumulative fire loads within the compartment and the type of vessel (e.g. an A-60 class division). Penetrations through these boundaries shall be protected to the same fire protection standard. For domestic vessels, the required fire protection may be defined in the applicable vessel regulations.
- (11) Early identification of a potential battery fire and automated actions prior to an incident are key to preventing thermal runaway and a possible chain reaction between adjacent cells. The battery compartment shall be fitted with detectors in accordance with manufacturer's recommendations which are capable of providing early identification of a fire. Possible early identification could involve the monitoring of local cell

temperatures or detection of electrolyte solvent vapours. When activated the detectors shall initiate appropriate alarms and may automatically isolate electrical systems and ventilation, or activate fixed fire-fighting systems.

- (12) An assessment shall be conducted to identify the most appropriate fire-fighting equipment and procedures for the types of fire within the battery space/compartment - such an assessment may consider at what point fire fighting using portable equipment may no longer be appropriate. Both extinguishment and heat removal are fundamental to fire-fighting efforts and many of the common firefighting mediums can be utilised once the relevant isolations are made (e.g. electrical or ventilation). It is strongly recommended that one or more fixed fire-fighting systems are designed and installed so that these can be operated from a safe location with feedback provided to confirm proper activation. In addition, portable fire extinguishers shall be provided to address the potential classes of fire within the battery compartment and the fire loads that they present. For certain vessel types a fire hydrant, hose and suitable nozzle shall also be available to access all parts of the battery compartment.

A6 - Battery Management System

- (1) The battery management system is required to maintain the condition of the cells and battery and protect them from unsafe situations such as internal battery defects, excessive external demands (e.g. a high current demand) and overcharging. It shall be ensured that the battery management system is compatible with the requirements of the battery system, the other battery components and the vessels electrical equipment. The use of risk assessment methods are important to ensure that all of the potential failures in the battery (and in the vessel, see paragraph 9.2) have been appropriately considered with mitigations adopted according to the severity of risk.
- (2) Abnormal temperature rise can be considered the first warning of thermal degradation of cells and shall be continuously monitored. Out of tolerance readings shall initiate an automatic response such as shut-down of a group of cells. It is recommended that temperature monitoring is provided at the cell level, especially if the batteries experience high charge or discharge rates. The battery management system may actively manage battery operations with respect to the temperature of the battery to improve efficiencies and to further reduce the risk of high temperature incidents. Due to the importance of temperature on batteries, continuous temperature monitoring may also be linked to responses external to the battery (e.g. isolation of the battery, early warning alarms and fixed fire suppression systems).
- (3) The battery management system shall limit currents to ensure the battery remains in a safe condition. Permitted currents may be controlled relative to the state of charge and shall take account of the battery's state of health through-life.
- (4) Lithium-ion cells, unlike other conventional battery technologies, shall not be charged in excess of 100% state of charge as this may cause rapid failure of the electrodes and possible thermal runaway. Discharging below the minimum safe voltage can also cause cell damage. Unlike other battery technologies, it is therefore not possible to balance the state of charge of several lithium-ion cells using top-off or trickle charging of the

battery, and it is vital that charging is stopped immediately if there is an unacceptable temperature rise - battery management systems shall only be employed if they are compatible with lithium ion batteries and are suitable for the application.

- (5) The battery management system shall be capable of monitoring cell voltages and currents to a high resolution in order to ensure that the voltage of each cell remains within the range specified by the manufacturer. Cell voltages shall be continuously monitored with an automatic alarm if these voltages exceed or fall below set limits, and a cell or battery shutdown shall occur automatically if any voltage approaches the cell-damage threshold.

A7 - Battery Operations and Procedures

- (1) Labels and signs - batteries, high voltage equipment, battery systems and compartments shall be adequately labelled using internationally agreed symbols where available. Emergency systems shall be appropriately labelled and be clearly visible.
- (2) Logbooks and configuration - it is recommended that a battery logbook is held onboard to record the status of the battery and its equipment. The logbook may include: equipment serial numbers and dates of manufacture/installation/testing/expiry, maintenance records, test results, defects, a summary of the battery charge/discharge cycles, etc. Software used for control, monitoring, data logging, alarm and safety systems, which may be part of the battery management system, shall be developed using robust and auditable processes. All software within such systems shall be version controlled and recorded.
- (3) Operational procedures – it shall be ensured that the battery system is never operated outside of its designed scope of assumptions and limitations. Therefore, although a battery system shall contain many cascading levels of protective devices, the vessel shall not employ operational procedures that rely on these protective devices for a safe condition.
- (4) For vessels utilising electrical power from the battery system for propulsive power or dynamic positioning, operational procedures are considered of prime important to both protect the battery system whilst ensuring that loss of a battery system does not affect the safety of the vessel or its operations. Formal operating procedures shall be developed for the operating scenarios expected of the battery, considerations might include failure scenarios (e.g. loss of a cooling system) to ensure that the battery is not inadvertently operated outside of safe parameters – it is expected that consideration of such scenarios may lead to further safety mitigations in the design of the battery system.
- (5) Inspections and maintenance – all inspections and maintenance shall be in accordance with manufacturer's recommendations but shall include the testing of all sensors, assessment of the state of health of each cell, recording of the environmental conditions in the battery compartment and assessment of any other relevant factors. Routine inspections may check for physical damage, cleanliness, signs of arcing or increased temperature, correct operation of ventilation and battery protection systems, etc.

Maintenance activities shall be planned in a vessel's maintenance schedule. Procedures shall be held onboard to detail the necessary actions if the battery is at risk of being operated outside of its normal operating envelope (e.g. during extended refit periods, following limited charge periods or following identification of a defect).

- (6) Emergency procedures shall be developed for the actions to be taken in all likely emergency scenarios; these may require consultation with an independent body such as a Recognised Organisation. Scenarios may include a battery localised high temperature, activation of a fire detection device, identification of a fire in the battery compartment (a battery fire or another combustible), a medical incident, flooding, violent cell venting, etc. Emergency procedures shall be held onboard and shall include actions to be taken by all stakeholders, including emergency services and salvage teams, to create a safe condition. Emergency drills and training shall be routinely conducted for all of the main emergency scenarios.
- (7) An assessment shall be made of the possible medical scenarios related to the battery and suitable mitigations shall be actioned whether these be pre-emptive (e.g. provision of personal protective equipment) or remedial (e.g. installation of an eye-wash station).
- (8) Crew Training - it is recommended that at no time shall there be less than two persons on the vessel who are adequately trained and experienced in all battery equipment and procedures. In addition, all crew shall have an awareness of the vessel's emergency procedures regarding the battery.

A8 - Further Information

MGN 550 (M+F) Electrical Installations - Guidance for Safe Design, Installation and Operation of Lithium-ion Batteries

BS EN 62281 Safety of primary and secondary lithium cells and batteries during transport

BS EN 62619 Safety requirements for secondary lithium cells and batteries for use in industrial applications

BS EN 62620 Secondary lithium cells and batteries for use in industrial applications

IEC 60529 - Specification for classification of degrees of protection provided by enclosures

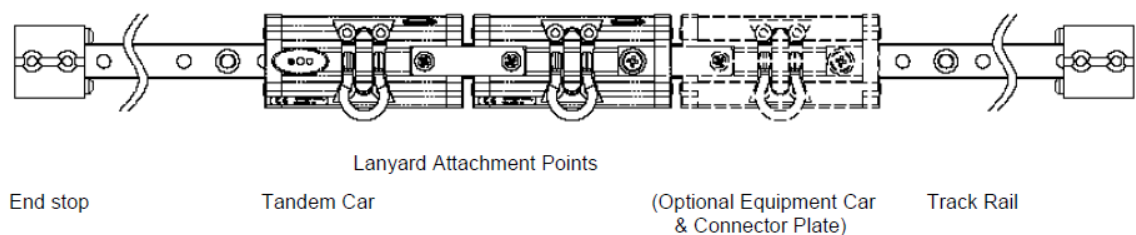
UN DOT 38.3 Recommendations on the transport of dangerous goods, manual of tests and criteria

ANNEX B

OVER-SIDE WORKING SYSTEMS

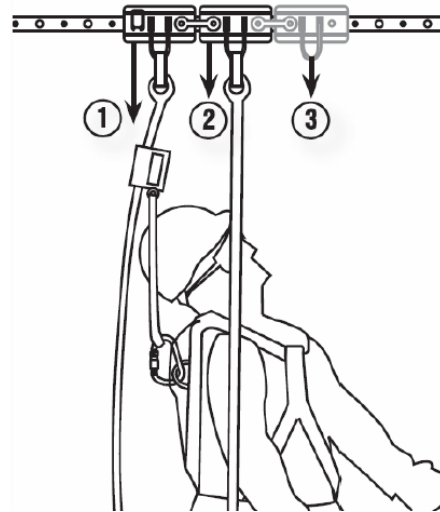
B1 - Introduction

- (1) The use of Over-side Working Systems are now considered standard on vessels, especially commercial yachts. Such installations allow crew members to work outside conventional guardrails for cleaning and maintenance purposes.
- (2) Most over-side working systems consist of one or a combination of the following:
 - (a) “Rail and car” or “rail and trolley” systems comprising of two travellers, cars or trolleys linked in tandem that can be separated if necessary into independent units. These cars are fitted to a metal rail which allows them to glide along it and to which support harnesses are attached.
 - (b) Harnesses, lanyards, fall arresters, energy absorber and similar devices.
 - (c) Single anchoring points, pad eyes and eye bolts
- (3) Traditionally many of the early “rail and car” systems were designed for the sole purpose of sail handling and not for supporting crew members working over the side of the yacht. Equipment which is used for supporting persons shall be designed for that purpose and it is not acceptable to use a “rail and car” system designed solely for sail handling for the purpose of supporting crew members working over the yacht’s side.
- (4) Below is an example of a “rail and car” system showing its construction.



- (5) Below is a typical set up for the attachments to the traveller cars.

1. Full-body safety harness
2. Working harness
3. Additional options, such as supporting a tool service car



B2 - Installation

- (1) Over-side working systems shall have their fixed components tested, certified and approved to a recognised European Union standard for fall protection equipment such as BS EN 795: 1997, Class D, and shall display the CE mark, or a similar International Standard
- (2) If it cannot be confirmed that the design of the attachment to the substrate is identical to that used in the type approval process completed by the over-side working system's manufacturer, or through approval of the design on another vessel, separate pre-installation testing is required to be satisfactorily completed prior to the system being installed.
- (3) In addition to the over-side working systems requiring type approval, the installation of the system to the substrate of the yacht shall be tested to meet the requirements of BS EN 795. For new vessels, this shall be in accordance with the 2012 version of BS EN 795.
- (4) Yacht substrates can be of many differing thicknesses and materials, as can the fixtures and fittings that secure the over-side working systems to the substrate. In all cases the method of installation to the particular substrate needs to be tested in accordance with BS EN 795 in order to be considered approved and suitable for supporting crew members working over the yacht's side. If a particular method of attachment of the over-side working systems to the yacht's substrate has been previously approved and documentary evidence can be provided only post-installation testing shall be required.
- (5) Trackway orientation to be within manufacturer's approval certificate considering the path of the harness line and resultant wear.

B3 - Pre-installation testing

- (1) When the method of attachment to the substrate has not been approved, additional static and dynamic load tests shall be required to prove the strength of the individual installation for each type of base material/fastener type. These tests effectively ‘type approve’ the method of attachment to the underlying structure. It is recommended that such testing is carried out in a workshop on a section of track of at least 400 millimetres in length attached to a representative mock-up of the vessel’s superstructure. Tests shall be witnessed by a Recognised Organisation and if successfully carried out, suitably endorsed records shall be retained.
- (2) The specifications for such tests are as follows:
 - (a) Static load test – this requires the application of a 12kN load in at least 3 locations, typically at both ends and at any rail joint or in the middle. This load shall be applied for 3 minutes.
 - (b) Dynamic load test – this requires the use of a test lanyard manufactured from rope conforming to BS EN 892 with a 100kg solid test mass dropped through a predetermined distance in order to apply a fall arrest load of 9kN. Direct reference shall be made to BS EN 795:2012 as to how this shall be achieved.

Following the dynamic load test, the car(s) and section of track used for testing shall have been overloaded and shall be discarded.

B4 - Post-installation testing

- (1) As with all lifting appliances, once the device has been installed onto the yacht a post-installation load test shall be carried out before the system is taken into use.
- (2) Testing post-installation shall be completed as follows:
 - (a) A test load of 6kN shall be attached to a single car or single anchor point for at least 15 seconds in at least 3 locations, typically at both ends and at any rail joint or in the middle.
 - (b) Such testing shall be carried out along with any additional requirements specified by the system manufacturer.
 - (c) The testing shall be witnessed by an approved party acceptable to the Administration and recorded on a suitable load test certificate, which is duly endorsed by the witnessing parties.

B5 - 5 yearly testing

- (1) The post-installation test shall be carried out at 5 yearly intervals and also at intervals prescribed by the manufacturer.

B6 - Non-compliant and pre-existing systems

- (1) Yachts fitted with uncertified over-side working systems, shall have the systems decommissioned, unless retrospective certification can be obtained.
- (2) Yachts fitted with over-side working systems or which there is evidence that the system is in compliance with either BS EN 795:1997 or 2012 but without evidence that the installation was tested by an approved surveyor.
 - (a) The system shall not be used until such time as the installation arrangements have been approved by an approved surveyor. This may require the submission of drawings of the existing attachment arrangements and the subsequent conducting of static and dynamic testing of the rail attachment method as deemed applicable. On satisfactory completion of this testing the over-side working systems shall have to be subject to the equivalent of the post-installation testing as defined previously in section 4.
- (3) Yachts fitted with over-side working systems for which there is evidence that the system is in compliance with either BS EN 795:1997 or 2012 and there is evidence that the installation was approved but there is no evidence of post-installation testing.
 - (a) The over-side working systems shall have to be subject to post-installation testing as defined previously in section 4.
- (4) In the case of section B6(1) – B6(3), prior to the completion of the required load testing, signage shall be clearly displayed stating the track is not to be used unless the crew member has a fall arrester attached by a secondary line which is secured to a strong point suitably tested to take the full load for fall arrest or around an item of yacht structure substantial enough to withstand the drop loads.

B7 - Operation

- (1) Before use the Owner or Company shall ensure that:
 - (a) the manufacturers' instructions are read and understood by the persons who shall be using the equipment;
 - (b) a risk assessment is carried out and an appropriate rescue plan developed to recover persons who fall into the water; and
 - (c) crew members are competent to use the equipment and are aware of any conditions relating to its use and their safety.
- (2) Over-side working systems shall not be used whilst the vessel is underway.
- (3) These systems are designed to be used with the appropriate PPE (harnesses, lanyards, fall arresters, lifejackets and other devices).
- (4) On systems where one of the travellers is fitted with a locking device, the device which locks the traveller in position along the track rail shall ONLY be disengaged from the track rail while the user is changing position. Once the user is in position, the locking

shall be re-engaged to hold the car in position and limit the user's movement along the track rail.

- (5) The user shall NEVER rely on only one attachment point for personal protective equipment. The working harness shall be attached to one traveller and a fall arrestor, or other safety device, to the other. A third traveller could be used to attach work tools.
- (6) More guidance can be found in the Code of Safe Working Practices Chapters on the use of permits to work.

B8 - Additional notes

- (1) Where any over-side working systems has been subject to a dynamic loading equivalent to fall arrest, the system shall be retired from service and subject to a full review by a representative of the manufacturer to confirm the system remains fit for continued use.
- (2) All over-side working systems shall be marked for the use of one user only.
- (3) The attachment of the safety harness to the car shall be in accordance with the manufacturer's instructions, which shall include an energy absorber certified for compliance with BS EN 355 or an equivalent national or international standard.
- (4) Regardless of whether the system shall be used for restraint or fall arrest, the more onerous test requirements shall be met.
- (5) Documentation retained onboard shall be as indicated in Annex A of BS EN 795:2012 or equivalent and shall include as a minimum:
 - (a) approved plans;
 - (b) certificates of load test for installation; and
 - (c) post-installation and periodical testing.

B9 - Further Information

BS EN 795:2012 Personal fall protection equipment – Anchor devices (It shall be noted that the original BS EN 795 standard has been replaced by BS EN 795: 2012);

BS EN 795:1997 Protection against falls from a height. Anchor devices. Requirements and testing;

BS EN 355:2002 Personal protective equipment against falls from a height. Energy absorbers; and

BS EN 892:2012 Mountaineering equipment. Dynamic mountaineering ropes. Safety requirements and test methods.

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ANNEX C

EMERGENCY TRAINING AND DRILLS

C1 - Life-Saving Appliances and Arrangements

Duties, Musters and Briefings

- (1) On a ship engaged on a voyage where passengers are scheduled to be onboard for more than 24 hours, musters of newly-embarked passengers shall take place prior to or immediately upon departure. Passengers shall be instructed in the use of the lifejackets and the action to take in an emergency.
- (2) Whenever new passengers embark, a passenger safety briefing shall be given immediately before departure, or immediately after departure. The briefing shall be made by means of an announcement, in one or more languages likely to be understood by the passengers. The announcement shall be made on the ship's public address system, or by other equivalent means likely to be heard at least by the passengers who have not yet heard it during the voyage. The briefing may be included in the muster required by paragraph (1). Information cards or posters or video programmes displayed on ships video displays may be used to supplement the briefing, but may not be used to replace the announcement.
- (3) The briefings referred to in subsection (2) may be delivered using alternative communication methods of conveying the required information provided that such alternative is at least as effective.
- (4) Crew members with enclosed space entry or rescue responsibilities shall participate in an enclosed space entry and rescue drill to be held onboard the ship at least once every two months. It is recommended that new seafarers shall attend a dedicated course for entry into dangerous spaces¹.

Emergency Drills

- (5) Drills shall, as far as practicable, be conducted as if there were an actual emergency.
- (6) Every crew member shall participate in at least one abandon ship drill and one fire drill every month and-
 - (a) where more than 25% of the crew have not participated in abandon ship and fire drills onboard that particular ship in the previous month the drills of the crew shall take place within 24 hours of the ship leaving a port;

¹ *Code of Safe Working Practices for Merchant Seafarers section 15.12.2 refers*

- (b) where a ship enters service for the first time, after modification of a major character or when a new crew is engaged, the drills shall be held before the vessel sails,

provided that the Administration may accept other arrangements that are at least equivalent where this is impracticable.

- (7) Each abandon ship drill shall include-
 - (a) summoning of passengers and crew to muster stations with the general emergency alarm followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship;
 - (b) reporting to stations and preparing for the duties described in the muster list;
 - (c) checking that passengers and crew are suitably dressed;
 - (d) checking that lifejackets are correctly donned;
 - (e) lowering of at least one lifeboat after any necessary preparation for launching;
 - (f) starting and operating the lifeboat engine;
 - (g) operation of davits used for launching liferafts;
 - (h) a mock search and rescue of passengers trapped in their staterooms; and
 - (i) instruction in the use of radio life-saving appliances.
- (8) Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of subsection (7)(e), at successive drills.
- (9) Except as provided in subsections (10), each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every three months during an abandon ship drill.
- (10) The Administration may allow ships operating on short international voyages not to launch the lifeboats on one side if their berthing arrangements in port and their trading patterns do not permit launching of lifeboats on that side provided that all such lifeboats shall be lowered at least once every three months and launched at least annually.
- (11) As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water and in any case this requirement shall be complied with at least once every three months.
- (12) If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills shall, because of the dangers involved, be practiced in sheltered waters only and under the supervision of an officer experienced in such drills.
- (13) If a ship is fitted with marine evacuation systems-

- (a) drills shall include exercising of the procedures required for the deployment of such a system up to the point immediately preceding actual deployment;
 - (b) this aspect of drills shall be augmented by regular instruction using the on-board training aids in the use of the system; and
 - (c) every system party member shall, as far as practicable, be further trained by participation in a full deployment of a similar system into water, either onboard a ship or ashore, at intervals of not longer than three years; provided that this training can be associated with the rotational deployments required by Annex II(21).
- (14) Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

Fire Drills

- (15) Fire drills shall be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur.
- (16) Each fire drill shall include-
- (a) reporting to stations and preparing for the duties;
 - (b) starting of a fire pump, using at least the two required jets of water to show that the system is in proper working order;
 - (c) checking of fireman's outfit and other personal rescue equipment;
 - (d) checking of relevant communication equipment;
 - (e) checking the operation of watertight doors, fire doors, fire dampers and main inlets and outlets of ventilation systems in the drill area; and
 - (f) checking the necessary arrangements for subsequent abandoning of the ship.
- (17) The equipment used during drills shall immediately be brought back to its fully operational condition and any faults and defects discovered during the drills shall be remedied as soon as possible.

Enclosed space entry and rescue drills

- (18) Enclosed space entry and rescue drills shall be planned and conducted in a safe manner, taking into account, as appropriate, the guidance provided in the recommendations developed by the Organisation².
- (19) Each enclosed space entry and rescue drill shall include:
- (a) checking and use of personal protective equipment required for entry;
 - (b) checking and use of communication equipment and procedures;

² See IMO Resolution A.1050(27) – Revised Recommendations for Entering Enclosed Spaces Aboard Ships
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- (c) checking and use of instruments for measuring the atmosphere in enclosed spaces;
- (d) checking and use of rescue equipment and procedures; and
- (e) instructions in first aid and resuscitation techniques.

On-board Training and Instructions

- (20) On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and in the use of the ship's fire-extinguishing appliances shall-
 - (a) subject to paragraph (b), be given as soon as possible but not later than two weeks after a crew member joins the ship;
 - (b) if the crew member is on a regularly scheduled rotating assignment to the ship, such training shall be given not later than two weeks after the time of first joining the ship;
 - (c) include instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea, which shall be given at the same interval as the drills;
 - (d) Incorporate individual instruction covering different parts of the ship's life-saving and fire-extinguishing appliances, such that all the ship's life-saving and fire-extinguishing appliances shall be covered within any period of two months.
- (21) Every crew member shall be given instructions which shall include but not necessarily be limited to-
 - (a) the operation and use of the ship's inflatable liferafts;
 - (b) the problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures;
 - (c) any special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions;
 - (d) the operation and use of fire-extinguishing appliances; and
 - (e) risks associated with enclosed spaces and onboard procedures for safe entry into such spaces which shall take into account, as appropriate, the guidance provided in recommendations developed by the IMO³.
- (22) On-board training in the use of davit-launched liferafts shall take place at intervals of not more than Four months on every ship fitted with such appliances. Whenever practicable this shall include the inflation and lowering of a liferaft. This liferaft may be a designated liferaft intended for training purposes only, which is not part of the ship's life-saving equipment; such a designated liferaft shall be conspicuously marked.

³ See IMO Resolution A.1050(27) – Revised Recommendations for Entering Enclosed Spaces Aboard Ships
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Records

- (23) The date when musters are held, details of abandon ship drills and fire drills, enclosed space entry and rescue drills, drills of other life-saving appliances and onboard training shall be recorded in such log-book as may be prescribed by the Administration; provided that if a full muster, drill or training session is not held at the appointed time, an entry shall be made in the log-book stating the circumstances and the extent of the muster, drill or training session held.

Training Manual and On-board Training Aids:

- (24) A training manual complying with the requirements contained in subsections (25) to (27) shall be provided in each crew mess room and recreation room or in each crew cabin.
- (25) Subject to subsection (26), the training manual, which may comprise several volumes, shall contain instructions and information, in easily understood terms, illustrated wherever possible, on the life-saving appliances provided in the ship and on the best methods of survival.
- (26) Any part of such information as is contained in the manual may be provided in the form of audio-visual aids in lieu of the manual.
- (27) The following shall be explained in detail in the manual or through the audio-visual aids, as the case may be-
- (a) donning of lifejackets, immersion suits and anti-exposure suits, as appropriate;
 - (b) muster at the assigned stations;
 - (c) boarding, launching, and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;
 - (d) method of launching from within the survival craft;
 - (e) release from launching appliances;
 - (f) methods and use of devices for protection in launching areas, where appropriate;
 - (g) illumination in launching areas;
 - (h) use of all survival equipment;
 - (i) use of all detection equipment;
 - (j) with the assistance of illustrations, the use of radio lifesaving appliances;
 - (k) use of drogues;
 - (l) use of engine and accessories;
 - (m) recovery of survival craft and rescue boats including stowage and securing;

- (n) hazards of exposure and the need for warm clothing;
 - (o) best use of the survival craft facilities in order to survive;
 - (p) methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus;
 - (q) all other functions contained in the muster list and emergency instructions; and
 - (r) instructions for emergency repair of the life-saving appliances.
- (28) Every ship fitted with a marine evacuation system shall be provided with on-board training aids in the use of the system.
- (29) The training manual shall be written in English and, where the working language of the crew is not English, in such working language as appropriate.

Drills on Part B vessels

- (30) An abandon ship drill and fire drill shall take place weekly. The entire crew need not be involved in every drill, but each crew member shall participate in an abandon ship drill and a fire drill each month. Passengers shall be strongly encouraged to attend these drills.
- (31) For Part B vessels, in addition to the requirement of section C1(15) to (17), fire drills shall be conducted in accordance with the provisions of section C1(30) having due regard to notification of passengers and movement of passengers to muster stations and embarkation decks.
- (32) A damage control drill shall take place at least every three months. The entire crew need not participate in every drill, but only those crew members with damage control responsibilities. The damage control drill scenarios shall vary each drill so that emergency conditions are simulated for different damage conditions and shall, as far as practicable, be conducted as if there were an actual emergency. Each damage control drill shall include:
- (a) for crew members with damage control responsibilities, reporting to stations and preparing for the duties described in the muster list required by SOLAS III/8;
 - (b) use of the damage control information and the on-board damage stability computer, if fitted, to conduct stability assessments for the simulated damage conditions;
 - (c) establishment of the communications link between the ship and shore-based support, if provided;
 - (d) demonstrating proficiency in the operation of watertight doors (sliding and hinged) and other watertight closures;
 - (e) demonstrating proficiency in the use of the flooding detection system, if fitted, in accordance with muster list duties;

- (f) demonstrating proficiency in the use of cross-flooding and equalization systems, if fitted, in accordance with muster list duties;
 - (g) operation of bilge pumps and checking of bilge alarms and automatic bilge pump starting systems; and
 - (h) instruction in damage survey and use of the ship's damage control systems.
- (33) At least one damage control drill each year shall include activation of the shore-based support, if provided in compliance with SOLAS II-1/8-1.3, to conduct stability assessments for the simulated damage conditions.
- (34) Every crew member with assigned damage control responsibilities shall be familiarized with their duties and about the damage control information before the voyage begins.
- (35) A record of each damage control drill shall be maintained in the same manner as prescribed for the other drills in SOLAS III/19.5.

C2 - Construction - Fire protection, fire detection and fire extinction

Instructions, On-board Training and Drills:

- (1) The purpose of this Section is to mitigate the consequences of fire by means of proper instructions for training and drills of persons onboard in correct procedures under emergency conditions and for this purpose, the crew shall have the necessary knowledge and skills to handle fire emergency cases, including passenger care.
- (2) Crew members shall receive instruction on fire safety onboard the ship.
- (3) Crew members shall receive instructions on their assigned duties.
- (4) Parties responsible for fire extinguishing shall be organised and such parties shall have the capability to complete their duties at all times while the ship is in service.
- (5) Crew members shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any fire-fighting systems and appliances that they may be called upon to use.
- (6) Training in the use of the emergency escape breathing devices shall be considered as part of on-board training.
- (7) Performance of crew members' assigned fire-fighting duties shall be periodically evaluated by conducting on-board training and drills to identify areas in need of improvement, to ensure competency in fire-fighting skills is maintained, and to ensure the operational readiness of the fire-fighting organisation.
- (8) On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with the provisions of C1(20)
- (9) Fire drills shall be conducted and recorded in accordance with the provisions of section C1(15) to (17) & C1(23)

- (10) A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.
- (11) The training manual shall be written in the working language of the ship.
- (12) The training manual, which may comprise several volumes, shall contain the instructions and information required in subsection (13) in easily understood terms and illustrated wherever possible; any part of such information may be provided in the form of audio-visual aids in lieu of the manual.
- (13) The training manual shall explain the following in detail-
 - (a) general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;
 - (b) general instructions on fire-fighting activities and fire-fighting procedures, including procedures for notification of a fire and use of manually operated call points;
 - (c) meanings of the ship's alarms;
 - (d) operation and use of fire-fighting systems and appliances;
 - (e) operation and use of fire doors;
 - (f) operation and use of fire and smoke dampers; and
 - (g) escape systems and appliances.
- (14) General arrangement plans⁴ shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks, etc., and the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section; provided that as an alternative, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available onboard in an accessible position and in any case plans and booklets shall be kept up to date; any alterations thereto shall be recorded as soon as practicable and the description in such plans and booklets shall be in English.

⁴ Refer to Graphical symbols for fire control plans, adopted by the IMO by Resolution A.654(16) and Resolution A.952(23) - Graphical Symbols for Shipboard Fire Control Plans for ships constructed on or after 01 January 2004.

- (15) A duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shore-side fire-fighting personnel⁵.
- (16) An onboard means of recharging breathing apparatus cylinders used during drills shall be provided or a suitable number of spare cylinders shall be carried onboard to replace those used.

⁵ Refer to the Guidance concerning the location of fire control plans for assistance of shoreside fire-fighting personnel (MSC/Circ.451).

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ANNEX D

GUIDELINES FOR THE INSTALLATION OF RECREATIONAL FIRE APPLIANCES

D1 - Introduction:

- (1) The intent of this Annex is to provide guidance on best practice and to facilitate the installation of Recreational Fire Appliances (RFA) such as fireplaces which use either wood, ethanol or liquefied petroleum gas (LPG) as a fuel source, charcoal galley ovens, LPG gas fired barbecues and charcoal barbecues, spit roasts and fire pits.
- (2) It shall be noted that this guidance will not cover every eventuality regarding the design, installation and operation of such items and that each case shall subsequently be considered separately.
- (3) For installations that fall outside the scope of this guidance, the use of Risk Assessments or Hazard Identification techniques (such as Failure Mode Effects Analysis (FMEA)) shall be performed to understand the potential safety related issues.

D2 - General Requirements

- (1) The method of securing the RFA and any of its doors or hatches in the closed position shall take into account the sea conditions likely to be experienced in service (i.e. roll, list, trim and heave) and possible damage due to mechanical impact from adjacent objects.
- (2) Clearance from any hot surfaces to combustible materials shall be sufficient to avoid heating combustible material to a temperature in excess of 90°F (32°C) above ambient and shall as a minimum be in accordance with the manufacturers recommendations but shall be at least:
- (3) Clearance from the exhaust duct to combustible material shall be in accordance with the requirements / recommendations of the Manufacturer. Where no such details are available, this distance shall be at least 230 millimetres.
- (4) Clearance from the sides and rear of the appliance to combustible material shall be in accordance with the requirements / recommendations of the Manufacturer. Where no such details are available, this distance shall be at least 460 millimetres
- (5) A carbon monoxide (CO) alarm on both main and emergency power shall be provided in any internal space in which a RFA is located.

- (6) The ventilation requirements of a space containing an RFA shall be assessed against an appropriate standard⁶ and shall take into account burning equipment and persons occupying that space⁷.
- (7) Requirements and / or recommendations published by the manufacturer of RFA shall be observed and implemented during the design and installation process.
- (8) The space in which any additional fuel is stored shall be treated as a Service Space (high risk) and shall be enclosed by 'A' Class fire rated boundaries as per the Structural Fire Protection Tables in the relevant part of the Code. See also subsections for fuel storage of different types.
- (9) Due consideration shall be given at the installation stage to the protection of personnel from hot surfaces and any exposed flames.
- (10) A dedicated portable extinguisher shall be located adjacent to externally located RFA, or within the same space that the RFA is installed when internal.
- (11) Any insulation used in the construction shall be non-combustible.
- (12) Any relevant national or international standards shall be followed.
- (13) The combined amount of bioethanol and any petrol that may be carried onboard shall not exceed 150 litres, unless formal agreement to carry larger quantities has been obtained directly from the Administration.

D3 - Operational Requirements

- (1) An appropriate risk assessment shall be made when using this type of equipment and its use be covered in the vessels Safety Management System.
- (2) Maintenance for all RFA and relevant systems shall be performed by trained or familiarised crew as appropriate in accordance with a maintenance plan produced by the manufacturer.
- (3) Operational instructions shall be provided and posted or otherwise readily available.
- (4) A shipboard procedure shall be developed outlining the requirements on the use of RFA, which shall be readily available to all involved, including outside caterers. This shall include a regular and thorough cleaning routine of all equipment and associated areas. The Master shall, after due inspection, decide whether to allow the use of the equipment subject to being satisfied about weather conditions and other safety factors.
- (5) Maintenance instructions shall be provided, which include the need for the installation to be inspected annually for soundness, freedom from deposits; operation of

⁶ The upper limit for indoor air quality standard set by the UK Dept of Health, Committee on the Medical Effect of Air Pollutants (COMEAP) for Carbon Monoxide (CO) is 10 ppm (8 - hour average)

⁷ The recommended occupational level of 5000 ppm (0.5% by volume) [8 - hour average] for Carbon Dioxide (CO₂) as recommended by the UK Health & Safety Executive, publication EH40/2005 "Workplace Exposure Limit"

interlocks/alarms and correct clearances where applicable. Cleaning, maintenance and repairs shall be undertaken if necessary at this time. The servicing requirements shall be included in any Safety Management documentation.

- (6) Where applicable, the crew member designated as the RFA operator shall be trained in the use of the firefighting equipment and the emergency procedures onboard. They shall, in consultation with the Master, set up and agree clear lines of communication shall there be an emergency incident.
- (7) It is not safe to use flammable liquids on a charcoal (or wood) fire to improve burning. Only use solid fuel fire lighters specifically made for lighting charcoal.
- (8) The disposal of any waste such as ash or coal waste shall be handled in accordance with MARPOL, the vessel's Safety Management system and Garbage Management Plan.
- (9) Where ventilators in intermittent use can be closed, there shall be appropriate signs at the appliance warning of the need to have those ventilators open before the appliance is used.

D4 - Ventilation for internal Appliances

- (1) Exhaust ducts shall be constructed of steel having a wall thickness of at least 3 millimetres and shall be of a type recommended by the RFA manufacturer.
- (2) The duct dimensions and the capacity of exhaust air to be provided shall be in accordance with the installation advice provided by the RFA manufacturer.
- (3) Exhaust duct connections shall be suitably located and kept to a minimum in order to prevent the risk of leakage of exhaust gases into the yachts' internal spaces.
- (4) Exhaust ducts shall be provided with cleaning/inspection openings in easily accessible locations which shall be tightly closed, sealed and secured when not in use. The exhaust ducts shall be located or shielded in order to prevent personnel from coming into contact with hot surfaces.
- (5) Any exhaust filters shall be in an easily accessible position for cleaning/maintenance purposes.
- (6) The exhaust duct penetrations of a fire rated division are to maintain the fire integrity of the bulkhead/deck.
- (7) Exhaust Fans (if fitted) shall be monitored and in case of failure, an audible and visual alarm shall be activated that is received immediately by a responsible member of the crew at all times when at sea, or in port.
- (8) Exhaust fans and ducts shall ventilate direct to the open atmosphere and be independent of other systems and each other.

- (9) A manually operated damper shall be provided in the lower end of a chimney (to isolate the chimney from a fireplace in the event of a fire in the chimney), the damper arrangement in the open position shall be such that the damper does not obstruct more than 20% of the duct area, (i.e. 80% free area of chimney is available when the damper is open).
- (10) The chimney shall be provided with a fixed fire extinguishing system. Controls for the system shall be located in a safe location outside the space or adjacent to the exit to the space. Where CO₂ is used as an extinguishing medium, the quantity of medium provided shall take into account the anticipated leakage rate associated with the outboard end of the chimney being open. Where dampers are provided to close the upper end of the chimney, means shall be provided to prevent over pressure on the duct boundaries.
- (11) A spark arrester (i.e. a screening device to prevent the passage of sparks and hot embers to the outside atmosphere) shall be provided at outlet ventilation openings.
- (12) Exhaust shall be routed to discharge directly to the outside of the vessel in a suitable area clear of any air intakes, vents from spaces or tanks containing flammable liquids and or dangerous zones which shall be located at least 3 metres away from any inlet.

D5 - Solid Fuelled Fireplaces

- (1) General Requirements:
 - (a) The proposed fireplace shall be enclosed within a steel enclosure with a glass or other heat resistant non-combustible material front being provided to prevent any burning material from falling from the burning chamber.
 - (b) Should the temperature within the chimney or burning chamber exceed manufacturer's recommendations, ventilation shall be automatically shut down and the door to the burning chamber automatically locked to ensure no more fuel can be added.
 - (c) A hearth of heat resisting non-combustible material (e.g. stone or tile) shall be provided in accordance with the RFA manufacturer, and be at least provided as per the following:
 - (i) Where the fireplace opening is less than 0.56m², the hearth shall extend at least 405 millimetres beyond the front of the fireplace and at least 200 millimetres beyond each side of the fireplace opening.
 - (ii) Where the fireplace opening is greater than 0.56m², the hearth shall extend at least 510 millimetres beyond the front of the fireplace and at least 300 millimetres beyond each side of the fireplace opening.
 - (iii) The hearth is to extend under the base of the fireplace.

- (2) Fuel Storage:
 - (a) Stores shall be protected by a fixed fire detection system and a sprinkler system or equivalent.
 - (b) No electrical equipment other than lighting shall be located in the store.
 - (c) A steel box shall be provided for ash collection and storage onboard.

D6 - Ethanol Fuelled Fireplaces

- (1) General Requirements:
 - (a) The proposed fire place shall be enclosed within a steel enclosure suitably insulated with a steel / glass front to the fire place.
 - (b) If expressly not required by the equipment manufacturer, fireplaces fueled by ethanol or bio-ethanol may not require a chimney or vent for exhaust gas. However, as a minimum, the design shall have the following features:
 - (i) Fail Safe concept: any electrical blackout or forced system shutdown stops the fuel injection automatically
 - (ii) Emergency Shutdown capable of manual operation.
 - (iii) Segregation of ancillaries (pump, pipework and burner): due to the compact design characteristics all the system components shall be segregated below the fireplace housing
 - (c) The fireplace shall be certified to a recognised standard (i.e. EU 2015/547 of 1st April 2015 – Alcohol powered flueless fireplaces pursuant to Directive 2001/95/EC of the European Parliament and of the Council on general product safety).
 - (d) The fireplace shall be locally protected by a sprinkler system, which may be manually controlled by the crew in case of emergency. The release of the fire fighting medium shall be located in a safe location outside the space or adjacent to the exit to the space and grouped with any other RFA controls as required above.
- (2) Fuel Storage:
 - (a) Signage, indicating the presence of flammable material and the prohibition of smoking shall be posted at the entrance to Storage Spaces.
 - (b) Portable Ethanol containers shall be of a certified-type and with spill proof spout or equivalent. The amount of Bioethanol that may be carried onboard shall be to the satisfaction of the Administration.
 - (c) Part A Vessels shall have the locker or compartment compliant with the requirements of Section 14.1.4 or 14.1.5 as applicable.
 - (d) Part B Vessels shall have the locker or compartment compliant with the requirements of Section 6.17

- (e) The fuel storage containers shall be positively secured against movement and protected from damage in any foreseeable event.

D7 - LPG Fuelled Installations

(1) General Requirements:

- (a) The installation shall be in accordance with recognised national or international Standards. An open flame gas appliance provided for cooking, heating or any other purpose shall comply with the requirements of EC Directive 90/396/EEC or equivalent.
- (b) Possible dangers arising from the use of liquid petroleum gas (LPG) open flame appliances in the marine environment include fire, explosion and asphyxiation, due to leakage of gas from the installation. Consequently, the siting of gas-consuming appliances and storage containers and the provision of adequate ventilation to spaces containing them, is most important.
- (c) Because of the risk of carbon monoxide poisoning, gas-consuming open flame appliances are not to be installed in sleeping accommodation.
- (d) LPG is heavier than air and if released, may travel some distance whilst seeking the lowest part of a space. Therefore, it is possible for gas to accumulate in relatively inaccessible areas, such as bilges, and diffuse to form an explosive mixture with air, as in the case of petrol vapour.
- (e) A frequent cause of accidents involving LPG installations is the use of unsuitable fittings and improvised "temporary" repairs.
- (f) Additional advice on the use of LPG for domestic installations and applications onboard ships and fishing vessels is contained in the Code of Safe Working Practices for Merchant Seafarers.

(2) Stowage of Gas Containers:

- (a) LPG cylinders, regulators and safety devices shall be stowed on the open deck (where leakage will not accumulate) or in a compartment that is vapour-tight to the vessels interior, and fitted with a vent and drain, so that any gas which may leak can disperse overboard.
- (b) The vent and drain shall not be less 19 millimetres in diameter, run to the outside of the craft and terminate 75 millimetres or more above the "at rest" waterline. Generally, the drain and locker ventilation shall be 500 millimetres or more from any opening to the interior.
- (c) The cylinders and associated fittings shall be positively secured against movement and protected from damage in any foreseeable event.
- (d) Any electrical equipment located in cylinder lockers shall be certified safe for use in the potential explosive atmosphere.

(3) Cylinders and Attachments:

- (a) Each system shall be fitted with a readily accessible, manually operated isolating valve in the supply pressure part of the system.
 - (b) In multiple container installations, a non-return valve shall be placed in the supply line near to the stop valve on each container. If a change-over device is used (automatic or manual), it shall be provided with non-return valves to isolate any depleted container.
 - (c) Where more than one container can supply a system, the system shall not be used with a container removed, unless the unattached pipe is fitted with a suitable gas tight plug arrangement.
 - (d) Containers not in use or not being fitted into an installation shall have the protecting cap in place over the container valve.
- (4) Fittings and Pipework:
- (a) For rigid pipework systems, solid drawn copper alloy or stainless steel tube shall be used. Steel tubing, aluminium, or any materials having a low melting point shall not be used.
 - (b) Connections between rigid pipe sections shall be made with hard solder (minimum melting point 450°C). Appropriate compression or screwed fittings are recommended for general use for pipework in LPG installations.
 - (c) Lengths of flexible piping (if required for flexible connections) shall conform to an appropriate standard, be kept as short as possible, and be protected from inadvertent damage. Such hose shall be installed in such a manner to allow access for inspection along its length. Proposals for a more extensive use of flexible piping (which conforms to an internationally recognised standard for its application) shall be submitted to the Administration for approval on an individual basis.
 - (d) Any piping shall be installed in such a manner as to have as few connections as possible and not to interfere with inspection, maintenance or servicing of the appliance.
- (5) Appliances:
- (a) All unattended appliances shall be of the room sealed type, i.e. where the gas flames are isolated in a totally enclosed shield where the air supply and combustion gas outlets are piped to open air.
 - (b) All gas burners and pilot flames shall be fitted with a flame supervision device which shall shut off the gas supply to the burner or pilot flame in the event of flame failure
 - (c) Flue-less heaters shall be selected only if fitted with atmosphere-sensitive cutoff devices to shut off the gas supply at a carbon dioxide concentration of not more than 1.5% by volume.
 - (d) Heaters of a catalytic type shall not be used.

(6) Gas Detection:

- (a) Suitable means for detecting the leakage of gas shall be provided in any compartment containing a gas-consuming appliance, or in any adjoining space of a compartment into which the gas (denser than air) may seep on both main and emergency power.
- (b) Gas detector heads shall be securely fixed in the lower part of the compartment in the vicinity of the gas-consuming appliance and in other space(s) into which gas may seep. In areas where the detector head is susceptible to damage in the lowest part of the compartment (e.g. engine space bilge) the detector head shall at least be fitted below the lowest point of ignition.
- (c) Any gas detector shall be of a type which shall be actuated promptly and automatically by the presence of a gas concentration in air of not greater than 0.5% (representing approximately 25% of the lower explosive limit). The detection system shall incorporate a visible alarm and an audible alarm which can be heard in the space concerned and the control position with the vessel in operation.
- (d) Where electrical detection equipment is fitted, it shall be certified as being flame-proof or intrinsically safe for the gas being used.
- (e) In all cases, the arrangements shall be such that the detection system can be tested frequently whilst the vessel is in service, which shall include a test of the detector head operation as well as the alarm circuit, in accordance with the manufacturer's instructions.
- (f) All detection equipment shall be maintained in accordance with the manufacturer's requirements.

(7) Operational Considerations:

- (a) A suitable notice, detailing the action to be taken when an alarm is given by the gas detection system, shall be displayed prominently in the vessel. The information given shall include the following:
 - (i) The need to be ever alert for gas leakage;
 - (ii) When leakage is detected or suspected, all gas-consuming appliances shall be shut off at the main supply from the container(s) and NO SMOKING shall be permitted until it is safe to do so;
 - (iii) Actions to increase the ventilation in the space; and
 - (iv) Naked lights shall never be used as a means of locating gas leaks.
- (b) Check for leaks shall be made every time a gas cylinder is replaced. If it is suspected that there is a leak to the cylinder or pipework, brush soapy solution around the connections and watch for bubbles – tighten to fix but do not overtighten. Do not use the RFA until the leak is fixed. Make sure all the connections are secure before turning on the gas.
- (c) After use, turn off the gas cylinder before turning off at RFA controls to ensure any residual gas in the pipe work is used up.

D8 - Charcoal Galley Ovens:

- (1) General Requirements:
 - (a) Suitable non-combustible insulation shall be provided directly between the base of the oven and the unit it is mounted on in order to prevent heat transmission.
 - (b) Suitable ventilation air supply arrangements to be provided in accordance with the Manufacturer's instructions. Supply air shall be capable of being shut off.
 - (c) A fire break and cowl to be fitted in accordance with the details provided in the manufacturer's data sheets.
 - (d) Carbon monoxide detector to be provided in all cases where such appliances are installed in enclosed spaces.
- (2) Operational Considerations:
 - (a) Coals shall always be soaked with water after cooking as they retain their heat for long periods of time. Remove the charcoal ashes from the grill only after they are cold to the touch and no warm embers remain and place them into a metal container with a tight-fitting metal lid.
- (3) Fuel Storage:
 - (a) Fuel storage shall be as per this annex according to the fuel type

D9 - External Fire Pits

- (1) General Requirements:
 - (a) Means of securing the fire pit firmly in place shall be provided.
 - (b) Deck Scuppers which are located in the vicinity of the Fire Pits proposed location shall be arranged to discharge directly overboard.
 - (c) Consideration and protection of overhanging deck or structure shall be made in agreement with the Administration
 - (d) The use of spark guards shall be considered.
- (2) Operational Considerations:
 - (a) A statement confirming that the use of the fire pit shall be limited to the open deck in a safe location well clear of any combustible material (in accordance with the measurements stated in the Manufacturers Data Sheet) when the vessel is either moored or at anchor and in favourable weather conditions
 - (b) Details highlighting that the burner is not to be left unattended when in use and that a portable extinguisher shall be readily available at all times
- (3) Fuel Storage:
 - (a) Fuel storage shall be as per this annex according to the fuel type

D10 - Barbecues and Spit Roasts for use in Open Deck Areas

- (1) General Requirements:
 - (a) The appliance shall be sited on an open deck in a well-ventilated position, clear of any hazard, such as overhanging combustible awnings, flammable liquids, etc. Under no circumstances shall any appliances be placed internally.
 - (b) In use, the appliance shall be safely secured to prevent movement caused by the vessel's motion.
 - (c) A fixed collecting tray shall be secured to the deck, or directly below the appliance, and the appliance suitably screened, to prevent fat, hot ash, etc. falling onto the deck.
 - (d) A suitable portable fire extinguisher shall be positioned close to the appliance along with heatproof gloves (2 pairs).
 - (e) The use of spark guards shall be considered.
- (2) Operational Considerations:
 - (a) Coals shall always be soaked with water after cooking as they retain their heat for long periods of time. Remove the charcoal ashes from the grill only after they are cold to the touch and no warm embers remain and place them into a metal container with a tight-fitting metal lid.
- (3) Fuel Storage:
 - (a) Fuel storage shall be as per this annex according to the fuel type

ANNEX E

PASSENGERS AND OCCASIONAL WORKERS

E1 - Passengers

- (1) "Passenger" means any person carried in a ship except:
 - (a) "Seafarers" as defined in Part A & Part B Chapter 2;
 - (b) "Occasional Workers" as described in this Annex;
 - (c) a person onboard the ship either in pursuance of the obligation laid upon the master to carry shipwrecked, distressed or other persons, or by reason of any circumstances that neither the master nor the owner nor the charterer (if any) could have prevented; and
 - (d) a child under one year of age.

E2 - Occasional Workers

- (1) It is not unusual for vessels to carry occasional additional staff, working in service for the owner or charterer for example, a nanny, masseuse or bodyguard. If the individual normally works on shore, and is onboard for a short period of time, with no emergency duties, they may not fall within the definition of a "seafarer" for the purposes of the MLC. In such cases, these Occasional Workers shall:
 - (a) have no emergency duties;
 - (b) for their own protection, and the safety of other members of the crew, shall have familiarisation training onboard such that they are capable of being self-sufficient in an emergency;
 - (c) be accommodated in a cabin and have access to mess areas and sanitary facilities of a standard which are in accordance with the crew accommodation standards applicable to the keel laying date of the yacht for existing yachts. For yachts with a keel laid after 20th August 2012 they are to be in accordance with MLC standards as laid out in Chapter 21 for Part A yachts and Chapter 9 for Part B yachts or equivalent provisions provided for by the administration.
 - (d) be at least 16 years of age;
 - (e) be medically fit to carry out their duties and to be self-sufficient in an emergency, although a seafarer's medical fitness certificate is not required;
 - (f) have a contract of employment, providing equivalent protection to that available under the MLC, taking into account their duties, pattern of working, normal place of work, and other relevant factors. It is recommended that the contract make reference to working in some capacity onboard the named yacht - this could be an addendum to the employee's shore-based contract;

- (g) shall not be required to meet the cost of food or medical care onboard, or of their travel back from the vessel to their normal place of work/home; and
 - (h) be trained to ensure their own health and safety onboard.
- (2) If any of the above criteria are not met/cannot be demonstrated to the satisfaction of the Administration, the individual shall be considered a passenger.
- (3) The DMLC Part II for the vessel shall include information on any roles onboard which shall be treated as occasional workers, how frequently such workers shall be onboard and for how long. It shall explain how the shipowner ensures that the above conditions are met for any occasional crew who are not seafarers. If the arrangements are persistently or frequently invoked for the same workers, the individuals shall be considered seafarers and full MLC requirements shall be applied.
- (4) Every person working on the vessel shall be included on the list of crew, unless they are treated as passengers. The Master shall therefore include occasional workers on the crew list named as such (or simply 'nanny' or 'bodyguard').

ANNEX F

GUIDANCE ON THE STORAGE OF LARGE QUANTITIES OF PETROL IN FIXED TANKS

F1 - Introduction

- (1) The following guidance shall be applied to dedicated petrol tanks used for refilling the yacht's tenders and jet skis, etc. located in a specially dedicated space.
- (2) If such a petrol storage system is proposed, the following safety considerations shall be met to the satisfaction of the Administration.

F2 - General Requirements

- (1) Storage tanks design, construction and material to be in accordance with the rules of a Recognised Organisation. Independent tanks to be constructed of steel with no penetrations in bottom and sides.
- (2) Storage tanks to be located in a dedicated gas tight compartment for that purpose only, except associated equipment for fuel transfer is allowed in this space.
- (3) Tanks may not be stored:
 - (a) within category A machinery spaces;
 - (b) under sleeping accommodation;
 - (c) forward of the collision bulkhead;
 - (d) less than B/5 from ship side;
 - (e) less than 760 millimeters from bottom plating; and
 - (f) adjacent to the aft end.
- (4) Tanks shall be explosion protected, meeting Recognised Organisation rules, to ventilate the storage tanks to a safe location to the satisfaction of the Administration and to prevent the risk of overpressure and fire/explosion. A vapour recovery system is recommended.
- (5) Remote means of tank level monitoring shall be provided outside the tank space, with a high level alarm to prevent overfilling of the tank. Gauge glasses are not permitted.
- (6) The space in which the tank is situated shall have gas-tight boundaries to adjacent spaces and be insulated to class "A-60".

- (7) The tank space fire detection shall be part of the vessel's addressable fire detection system.
- (8) The tank space fire suppression shall be in accordance with:
 - (a) Part A Vessels, 14.1(5)(a)
 - (b) Part B Vessels, 6.15(18)
- (9) The tank space ventilation shall be in accordance with:
 - (a) Part A Vessels, 14.1(5)(c)
 - (b) Part B Vessels, 6.15(3)
- (10) The tank space ventilation outlet shall be located in a safe position, and fitted with a flame arrester in accordance with IMO MSC/Circ.677.
- (11) Tank space water drainage system shall be provided sized to remove no less than 125% of the water capacity from the required fire-suppression systems, and shall not be connected to any other system. Alternatively, if stability requirements are still met in the event of the tank space being completely filled with water, the drainage system can be less than the capacity of the required fire suppression systems.
- (12) A suitable gas detection system shall be provided, with audible and visual alarm in the wheelhouse in each space through which petrol lines pass, including tank space in accordance with the Rules of a Recognised Organization.
- (13) Electrical equipment, including fixed and portable lighting, for use in the tank space and within the hazardous zone areas shall be kept to a minimum and is all to be certified safe for petrol vapours.
- (14) Petrol system pipework shall:
 - (a) be steel and enclosed within a gas tight steel box or pipe fitted with a leak detection system;
 - (b) if within a steel box/cofferdam, then the space shall have a petrol vapour gas detection system;
 - (c) not be led directly through accommodation or machinery spaces; and
 - (d) between storage tank, dispenser and bunker station be kept as short as possible;
- (15) Shore to vessel petrol bunker connections shall be of closed type and suitably grounded during bunkering operations.
- (16) At least two portable foam fire extinguishers or equivalent for petrol fires, of at least 9 litres capacity, shall be provided near the petrol dispenser.
- (17) At least two portable foam fire extinguishers or equivalent for petrol fires, of at least 9 litres capacity, shall be provided near the filling (bunker) station

- (18) Means shall be provided for leakage protection to contain and remove any leakages from the storage tanks, dispenser and bunker station equipment to a safe location, e.g. save-alls. The drainage system shall not be connected to any other onboard system.
- (19) Hazardous zone areas shall be provided in accordance with a Recognised Organisation's Rules, e.g. distance from the storage tank vent, dispenser and bunkering station to any sources of ignition.
- (20) Safety signage ("No Smoking" signs, etc.) shall be fixed or temporary safety signs shall be provided in accordance with recognised standards in all appropriate areas including, but not limited to:
 - (a) bunkering
 - (b) dispensing
 - (c) tank storage
 - (d) vent outlets
- (21) Operational procedures shall be documented in the Safety Management System and enforced including, but not limited to:
 - (a) Risk assessment carried out.
 - (b) Emergency procedures for various scenarios shall be developed and drilled, e.g. Shipboard Oil Pollution Emergency Plan (SOPEP) and bunkering and dispensing procedures.
 - (c) No storage within tank space.
 - (d) Regular tank space inspections for integrity/cleanliness.
 - (e) Tank space access hatch shall be kept closed except for entry.
 - (f) No unauthorised access to tank space.
 - (g) Entry into enclosed tank space procedures shall be enforced.
 - (h) No naked flames.
 - (i) No smoking.

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ANNEX G

MANNING, CERTIFICATION AND HOURS OF WORK

G1 - Application

- (1) This Annex applies to all yachts to which the Code applies and to the certification, training and qualifications of the master, officers and crew on such yachts and their hours of work and rest.

G2 - Purpose

- (2) The purpose of the provisions of this Annex are to-
 - (a) set out the responsibilities of the owners, masters, crew and operators of yachts with respect to safe manning;
 - (b) ensure that the yacht is at all times adequately manned such that all relevant safety and marine environment protection and security standards can be maintained bearing in mind the other day to day operational requirements of the yacht;
 - (c) ensure that all crew onboard the yacht are properly trained, certificated and qualified for the position held and the duties shall be discharged; and
 - (d) ensure that the master, officers and other crew members are adequately rested before assuming duties, particularly where such duties impinge on the safety of the vessel, the protection of the marine environment and security duties; and
 - (e) ensure that all seafarers are medically fit.

G3 - Safe Manning

General

- (1) All yachts to which this Code applies shall carry, in addition to the master, a sufficient number of qualified deck and engineer officers, together with a sufficient number of appropriately qualified ratings, to ensure that the yacht can at all times be operated safely, with respect to the safety of the yacht and all persons onboard, the protection of the marine environment and maritime security.

Principles of Safe Manning

- (2) In assessing the appropriate safe manning level for a yacht due regard shall be given to:
 - (a) IMO Resolution A.1047(27) (as amended from time to time) which defines the principles of safe manning necessary to ensure the safe operation of ship and the prevention of pollution of the marine environment;

- (b) applicable international conventions, including STCW and the MLC; and
- (c) national legislation relating to Safe Manning Certification, Hours of Work and Rest and related matters.

Responsibility for Safe Manning:

- (3) It is the responsibility of the owner, master and operators of yachts to ensure that at all times the vessel is safely manned and operated in compliance with the standards of safety, marine environment protection and security set out in the various applicable international Conventions, Codes and national legislation and in accordance with any Safe Manning Document or similar certification in force with respect to the ship.
- (4) In assessing the appropriate level of manning for a yacht the following factors, in addition to those in subsection (2) are among those which shall be taken into account-
 - (a) the size, type and complexity of the yacht and its equipment;
 - (b) type and size of the yacht's main propulsion and auxiliary machinery;
 - (c) the area and type of operation in which the yacht shall be engaged including-
 - (i) likely navigational and other hazards to be encountered;
 - (ii) frequency of port calls; and
 - (iii) density of traffic; and
 - (d) the demands on the master, officers and crew in the normal day to day running of the yacht over and above safety and marine environmental protection considerations;
 - (e) the need to mount safe navigational and engine watches at sea, at anchor and in port;
 - (f) peak workloads;
 - (g) the need to provide statutory periods of rest;
 - (h) on-board maintenance requirements;
 - (i) on-board mooring and unmooring arrangements;
 - (j) emergency situations and procedures including the mustering and evacuation of passengers;
 - (k) compliance with the yacht's Safety Management System; and
 - (l) compliance with Maritime Security requirements.

Safe Manning Document

- (5) SOLAS requires that vessels of 500GT and above, excluding pleasure vessels not engaged in trade, carry a Safe Manning Document. Owners and operators of vessels

below 500GT, or those of 500GT and above solely engaged for pleasure, may also choose to hold a Safe Manning Document. This shall allow the owner to consider a 'range and risk' approach when determining manning levels.

- (6) In the event of any change in equipment, construction or use of the vessel, which may affect the safe manning level, the owner or operator shall make an application for the issue of a new Safe Manning Document.
- (7) A Safe Manning Document of a vessel may be withdrawn if an owner or operator fails to submit a new proposal where a vessel changes trading area(s), construction, machinery or equipment, or operation and/or method of maintenance have changed, or a vessel persistently fails to comply with the hours of rest requirements.

Application for a Safe Manning Document:

- (8) Vessels to which the Code applies shall be in possession of a Safe Manning Document or similar certification which signifies that the Administration has approved the minimum manning levels for the yacht in accordance with 1.4(1).
- (9) Application for a Safe Manning Document or Certificate shall be made to the Administration, in accordance with its procedures, by the owner or operator of the yacht or a person duly authorised to act in this regard and the application shall present a clear rationale on which the proposed manning is based, including-
 - (a) an explanation of how the proposed manning has been determined;
 - (b) Confirmation that the assessment has taken account, as a minimum, of all the relevant guidelines as set out in this Annex;
 - (c) how the requirements relating to hours of work and rest shall be complied with; and
 - (d) details of the yacht in terms of its size, layout, equipment propulsion and auxiliary machinery and other such relevant factors affecting manning levels⁸
- (10) More than one proposal for safe manning for the same yacht may be submitted to take account of differing operational patterns or a variation in the number of passengers carried.

Qualifications and Training:

- (11) In general terms the Master and Officers serving on a yacht to which this Code applies shall be certificated in accordance with the relevant provisions of the STCW Convention, provided that for Part B Private Passenger Yachts of less than 3000 GT and Part A Yachts of less than 3000 GT, appropriate Yacht qualifications may be accepted by the Administration.

⁸ The procedures of Administration concerned with respect to applications for Safe Manning Documents shall provide further detail as necessary. To effectively convey the general layout and equipment of the yacht, including mooring and un-mooring arrangements, appropriate plans shall be submitted which shall include a General Arrangement Plan.

- (12) Any person employed or engaged in any capacity onboard a seagoing ship to which this Code applies, other than a seafarer employed or engaged as such in accordance with subsection (3), shall be deemed to be a passenger unless such person has satisfactorily undergone familiarisation training and instruction in accordance with the Code to the STCW⁹ and is in possession of appropriate documentation attesting to the satisfactory completion of such familiarisation training and instruction.
- (13) Any seafarer employed or engaged in any capacity onboard a seagoing ship to which this Code applies, on the business of that ship as part of the ship's complement with designated safety or pollution prevention duties in the operation of the ship shall, in addition to the familiarisation training referred to in subsection (2) and before being assigned to any shipboard duties, have received basic safety training and instruction in accordance with the Code to the STCW¹⁰ and be in possession of appropriate documentation attesting to the satisfactory completion of such training and instruction.
- (14) The number of trained persons shall always be sufficient to assist the total number of passengers who may be onboard at any one time.

Additional Requirements for Part B Vessels:

- (15) Masters and officers shall receive additional training¹¹ to enable them to perform their duties properly with respect to the carriage of passengers.
- (16) Other crew members who are nominated on muster lists to assist passengers in emergency situations shall also have undergone appropriate additional training¹¹.
- (17) In relation to Part B Chapter 9 of the Code (Accommodation and Recreation Facilities-Design and Construction), officers include the following persons holding the appropriate qualifications and serving in the following-

- | | |
|--|---|
| (a) Master. | (f) Other Officers in the Deck or Engine Department designated as such in the ship's Articles of Agreement or Employment Agreement. |
| (b) Chief Engineer. | (g) Electro-Technical Officer (ETO). |
| (c) Chief Officer/Chief Mate. | (h) Chief Steward/Purser(Head of interior department) |
| (d) Officer in Charge of a Navigational Watch (Deck Officer). | |
| (e) Officer in Charge of an Engine Room Watch (Engineer Officer) | |

G4 - Medical Fitness

- (1) All seafarers serving onboard vessels to which the Code applies shall be in possession of a valid Medical Fitness Certificate issued or recognised by the Administration.

⁹ See Section A-VI/1 of Part A of the Code to the STCW paragraph 1.

¹⁰ See Section A-VI/1 of Part A of the Code to the STCW paragraph 2.

¹¹ Training shall be in accordance with Regulation V/2 of Part A of the Code to the STCW as required by the Administration.

G5 - Schedule of Duties

- (1) The Master shall ensure that a schedule of duties is drawn up setting out the hours of work and rest periods for each of the crew. The table or schedule shall show:
 - (a) the schedule of duties at sea and duties in port; and
 - (b) the minimum hours of rest as defined by the MLC.
- (2) In devising the schedule, operators shall take account of factors such as:
 - (a) nature of the operation;
 - (b) type and size of vessel;
 - (c) construction and technical equipment of the vessel;
 - (d) manning levels and changes in crew numbers due to crew changes and
 - (e) sickness;
 - (f) the maximum period of continuous watchkeeping;
 - (g) minimum rest periods;
 - (h) total workload;
 - (i) compliance with the ISPS Code as applicable;
 - (j) the seriousness of irregular working hours and their contribution to causing fatigue and the importance of scheduling reasonably stable working hours.
- (3) Changes shall not be made to the schedule of duties unless they can be justified by substantially altered work patterns or other significant factors.
- (4) Where it is known that a vessel engages in an irregular pattern or that working hours are unlikely to be uniform, this can be taken into account when considering the schedule.
- (5) It is not necessary to draw up a new schedule of duties for each voyage, so long as it is applicable to the voyage in question and the composition of the crew for whom it was originally intended has not changed.
- (6) A copy of the schedule shall be made available to all members of the crew.

G6 - Hours of Work and Rest:

- (1) All members of the yacht's complement, including the Master, shall have minimum rest periods and maximum periods on duty (emergencies excepted) in accordance with the provisions of the STCW, MLC and national legislation.
- (2) Owners and operators of yachts shall ensure that the master, officers and ratings do not work more hours than is safe in relation to the performance of their duties and the

safety of the ship in accordance with the provisions referred to in subsection 12.5(1) and the master shall ensure that these provisions are adhered to onboard by suitable arrangements with respect to the assignment of duties; manning levels shall therefore be such as to ensure that the master, officers and crew are afforded the opportunity to take the minimum rest periods.

- (3) The time and place of rest periods shall be such as to ensure that such periods can be taken in a suitable environment conducive to achieving an effective rest.
- (4) Further guidance about fitness for duty is contained in section B-VIII/1 of the STCW.

Minimum Hours of Rest

- (5) The owner/operator or Master shall ensure that the crew are provided with at least the minimum hours of rest. These shall not be less than:
 - (a) 10 hours in any 24-hour period; and
 - (b) 77 hours in any seven-day period.
- (6) Hours of rest may be divided into no more than 2 periods; one of which shall be at least 6 hours long, and the interval in between shall not exceed 14 hours.
- (7) It is expected that as far as practicable the Master shall arrange for conducting emergency drills such as musters, fire-fighting and abandon vessel drills in a way which minimises the disturbance to rest periods and provide compensatory rest for seafarers whose normal rest is disturbed by call-outs for drills.

Records

- (8) A record of the actual hours of work performed by the individual seafarer shall be maintained onboard, in order to verify that the minimum periods of rest required under applicable international instruments and national legislation have been complied with.
- (9) The master or authorised person is responsible for ensuring that records of hours of rest are maintained for each of the crew serving on the vessel. Each record shall be endorsed by the master or authorised person and the seafarer. A copy shall be retained by the seafarer.
- (10) In an emergency, or when unforeseen events occur, changes may be unavoidable. In these cases records shall reflect all deviations from the schedule.
- (11) All records shall be kept for a minimum of 12 months and shall be available for inspection by the Administration surveyors at any time. Checking the vessel's records may be carried out by the Administration as part of the normal routine of vessel inspection and shall include a check that the appropriate schedules are available and records maintained.

Exceptions for Emergencies

- (12) Situations may arise in which a seafarer may be required to work during scheduled hours of rest. These include emergencies which threaten the safety of the vessel or put life at risk. In these circumstances, the limits may be exceeded provided compensatory arrangements are subsequently made to avoid fatigue.

On-Call Time

- (13) Where a seafarer's normal period of rest onboard a vessel is disturbed by a callout he/she shall have adequate compensatory rest.

G7 - Personal Water Craft

- (1) The operators are reminded that operation of personal watercraft shall comply with the applicable legislation of the state in whose waters they are being operated.

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ANNEX H

HELICOPTER LANDING AREAS (HLA)

H1 - General Considerations:

(1) Introduction

- (a) This Annex outlines the minimum standards for Helicopter Landing Areas (HLA), and associated facilities onboard vessels within the scope of this Code where helicopter operations to or from the vessel are required. It also addresses operational considerations as related to the yacht crew.
- (b) The appointed Aviation Inspection Body is responsible for the issuing of the following certificates:
 - (i) A “Helicopter Landing Area Technical Certificate” may be issued where only the physical design characteristics of this annex have been met, but may include operational limitations such as night use or maximum wind speeds etc; and
 - (ii) A “Helicopter Landing Area Certificate” shall be issued when all of the requirements of this Annex have been met, and will also note any operational deck limitations.
- (c) Requirements with respect to a HLA on a vessel, results from the need to ensure that helicopters are afforded sufficient space to be able to operate safely at all times in the varying conditions experienced.
- (d) In order to ensure safe operation it is envisaged that limitations regarding the availability of the landing area shall be applied by the Aviation Inspection Body on behalf of the Administration.
- (e) The helicopter’s performance requirements and handling techniques are contained in, and governed by, the Rotorcraft Flight Manual and/or the operator’s Operations Manual.

(2) Definitions

‘*Aviation Fuel*’ means it is used as a fuel for modern jet and turboprop engines. It consists primarily of hydrocarbon compounds, but other additives are present to increase safety. International regulations stipulate uniform standards for the quality and composition of kerosene.

‘*D-Value*’ means the largest overall dimension of the helicopter when rotors are turning. This dimension shall normally be measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane (or the most rearward extension of the fuselage in the case of Fenestron or Notar tails).

'Shipboard Heliport' or 'Helicopter Landing Area' means a purpose-built helicopter landing area *located* on a ship including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters

'Helicopter Landing Area Certificate (HLAC)' means a certificate issued by an AIB to confirm the Shipboard Heliport and associated facilities meet the minimum requirements of the Code

'Helicopter Landing Area Technical Certificate (HLATC)' means a certificate issued by an AIB to confirm the Shipboard Heliport and associated facilities meet the minimum physical characteristics required in accordance with the Code

'ICAO' means International Civil Aviation Organisation.

(3) Risk Assessment

- (a) In all cases, a formal and documented risk assessment of the operation shall be carried out by a suitably experienced and qualified individual authorised by the yacht's Administration. The risk assessment shall establish the hazards and resultant risks associated with the operation of each helicopter type that it is planned to utilise the HLA of the yacht concerned. This shall include the physical requirements for the characteristics of the landing area.

(4) Further guidance

- (a) This Annex does not address helicopter flight operations in any detail. It is intended as a technical standard for the landing area and associated on-board helicopter facilities. The helicopter pilot/operator is responsible for ensuring that the requirements of the Administration with which the helicopter is registered and the requirements of the Administration responsible for the airspace in which the helicopter is operating are complied with in full. The Aviation Inspection Body may provide further guidance.
- (b) The Red Ensign Group's *'Helicopter Operations Guide'* (as amended) shall be considered during the development of Helicopter Landing Areas and their safe operations.
- (c) Enquiries regarding operational (flight) limitations based on non-compliances of the landing area shall be directed to the Aviation Inspection Body.

H2 - Design and Construction

(1) Introduction

- (a) This section provides information on physical requirements for the characteristics of helicopter landing areas on a yacht within the scope of the Code.
- (b) The risk assessment carried out in H1.3(1) in order to establish the adequacy of the landing area shall include, for each helicopter landing area, the proposed maximum size of helicopter in terms of D-value and the proposed maximum

take-off weight of the heaviest helicopter in terms of “t” value for which it is proposed each landing area is certificated with regard to size and strength.

- (c) The criteria which follow (see Table H.1) are based on helicopter size and weight and are for guidance only. The latest information shall be sought from the helicopter manufacturer.

Table H.1 - Value and Helicopter Type Criteria (Not Exhaustive)

TYPE	D VALUE (M)	PERIMETER ‘D’ MARKING	ROTOR DIAMETER (M)	MAX. WEIGHT (KG)	‘T’ VALUE
MD 500E	9.4	9	8.05	1361	1.4
Robinson R44	11.66	12	5.03	1134	1.2
Airbus Ind. H120	11.52	12	10.00	1715	1.7
MD 600N	11.79	12	8.38	1860	1.9
Bell 206 B3	12.11	12	10.16	1519	1.5
Bolkow Bo 105D	12.00	12	9.90	2400	2.4
MD 902	12.37	12	10.34	3250	3.3
Bell 206 L4	12.91	13	11.28	2018	2.0
Bell 407	12.61	13	10.66	2268	2.3
Airbus Ind. H130	12.64	13	10.69	2400	2.4
Airbus Ind. H125 B3	12.94	13	10.69	2250	2.3
Airbus Ind AS355	12.94	13	10.69	2800	2.8
Airbus Ind H135	12.10	12	10.20	2720	2.7
Agusta A119	13.02	13	10.83	2720	2.7
Bell 427	13.00	13	11.28	2971	3.0
Bell 429	13.11	13	10.98	3175	3.2
Bolkow 117	13.00	13	11.00	3200	3.2
Airbus Ind H145	13.03	13	11.00	3585	3.6
Agusta A109	13.05	13	11.00	2600	2.6
Agusta Grand	12.96	13	10.83	3175	3.2
Airbus Ind AS365 N3	13.73	14	11.94	4300	4.3
H155 B1	14.30	14	12.60	4920	4.9
AW 169	14.65	15	12.12	4500	4.5
Bell 430	15.29	15	12.80	4218	4.2
Sikorsky S76	16.00	16	13.40	5318	5.3
Agusta /Bell 139	16.66	17	13.8	6400	6.4
Bell 212	17.46	17	14.63	5080	5.1
Bell 412	17.13	17	14.02	5398	5.4
AW 189	17.6	18	14.6	8300	8.3
Airbus Ind. H175	18.06	18	14.8	7500	7.5

TYPE	D VALUE (M)	PERIMETER 'D' MARKING	ROTOR DIAMETER (M)	MAX. WEIGHT (KG)	'T' VALUE
Super Puma AS332L	18.70	19	15.00	8599	8.6
Bell 214ST	18.95	19	15.85	7938	8.0
SuperPuma AS332L2	19.50	20	16.20	9300	9.3
H 225	19.50	20	16.20	11000	11.0
Bell 525	19.75	20	15.7	9299	9.3

(d) In addition to the risk assessment, the following plans and particulars shall be submitted to the Aviation Inspection Body, Certifying Authority and Administration (as appropriate) for approval-

- (i) Hangar general arrangement (showing dimensions and structural considerations).
- (ii) Helicopter lift and movement arrangements (if appropriate).
- (iii) Structural fire protection.
- (iv) Fire detection and extinguishing arrangements

(2) Purpose

(a) The purpose of this regulation is to provide additional measures in order to address the fire safety objectives of this chapter for ships fitted with special facilities for helicopters and for this purpose, the following functional requirements shall be met:

- (i) Shipboard Heliport structure shall be adequate to protect the ship from the fire hazards associated with helicopter operations;
- (ii) fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with helicopter operations;
- (iii) refueling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with helicopter operations; and
- (iv) operation manuals and training shall be provided.

(3) General Requirements

- (a) Helicopter Landing Areas shall be referred to as Shipboard Heliports and meet the requirements of ICAO Annex 14 Volume II to the Convention on International Civil Aviation.
- (b) The standards of ICAO Annex 14 Volume II shall be followed where applicable for:
 - (i) "Purpose-built Shipboard Heliports"; and

- (ii) “Purpose-built Shipboard Heliports provided in the bow or stern of the ship”

Reference shall also be made to Part 1 of the ICAO Document No. 9261 (Heliport Manual), which provides guidance for the implementation of ICAO Annex 14 as applicable to Shipboard Heliports.

- (c) The structural strength of the helicopter landing area shall be designed and constructed according to rules of a Recognised Organisation on helicopter landing areas for vessels.

(4) Construction of steel or other equivalent material

- (a) In general, the construction of the Shipboard Heliports shall be of steel or other equivalent materials. The underside of the Shipboard Heliport in way of all enclosed spaces shall be insulated to A-60 Class Standard.

(5) Construction of aluminium or other low melting point metals

- (a) If the Administration permits aluminium or other low melting point metal construction that is not made equivalent to steel, the following provisions shall be satisfied:

- (i) The underside of the Shipboard Heliport in way of all enclosed spaces shall be insulated to A-60 Class Standard.
- (ii) after any fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use; and
- (iii) consideration shall be given to the protection of any glazed openings in exposed locations immediately forward of and / or below the Shipboard Heliport. Such glazed openings do not include those that are considered to be adequately protected by an overhanging superstructure deck or are located within recesses in the Hull Side.

(6) Fire Fighting Appliances

- (a) The following fire-fighting appliances and associated equipment shall be provided:

- (i) at least two dry powder extinguishers having a total capacity of not less than 45 kilograms;
- (ii) carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;
- (iii) a suitable foam application system consisting of monitors or foam making branch pipes or Deck Integrated Firefighting System (DIFFS) capable of delivering foam to all parts of the Shipboard Heliport in all weather conditions in which helicopters can operate and which shall be capable of delivering a discharge rate as required in Table H.2 for at least five minutes. The principal agent shall be suitable for use with

saltwater and conform to performance standards not inferior to those acceptable to the IMO¹²;

- (iv) at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the Shipboard Heliport;
- (v) in lieu of the requirements of paragraphs (iii) through (iv), on ships constructed on or after 1 January 2020 having a Shipboard Heliport, foam firefighting appliances which comply with the provisions of the Fire Safety Systems Code Chapter 17;
- (vi) in addition to the requirements of the relevant Part of the Code, two sets of fire-fighter's outfits compliant with the IMO's Fire Safety Systems (FSS) Code, Chapter 3, Section 2; and
- (vii) at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements-
 - (ba) adjustable wrench
 - (bb) blanket, fire resistant;
 - (bc) cutters, bolt, 60 cm;
 - (bd) hook, grab or salving;
 - (be) hacksaw, heavy duty complete with 6 spare blades;
 - (bf) ladder;
 - (bg) lift line 5 millimetres diameter × 15 m in length;
 - (bh) pliers, side-cutting;
 - (bi) set of assorted screwdrivers; and
 - (bj) harness knife complete with sheath.

¹² Refer to the *International Civil Aviation Organization Airport Services Manual*, part 1, Rescue and Fire Fighting, chapter 8, Extinguishing Agent Characteristics, Paragraph 8.1.5, Foam Specifications table 8-1, Level "B".

Table H.2 Foam discharge rates

Category	Helicopter overall length	Discharge rate foam solution (l/min)
H1	up to but not including 15m	250
H2	from 15m up to but not including 24m	500
H3	from 24m up to but not including 35m	800

- (b) During Helicopter take-off and landing operations, portable appliances and loose equipment shall be stored in close proximity to the Shipboard Heliport and near its means of access / escape.

(7) Drainage Facilities

- (a) Drainage facilities in way of Shipboard Heliports shall be constructed of steel and shall lead directly overboard independent of any other system and shall be designed so that drainage does not fall onto any part of the ship.

(8) Access Points and Means of Escape

- (a) Many helicopters have passenger access on one side only and helicopter landing orientation in relation to landing area access points becomes important because it is necessary to ensure that embarking and disembarking passengers are not required to pass around the helicopter tail rotor, or under the front of the main rotor of those helicopters with a low profile rotor, should a 'rotors-running turn-round' be conducted.
- (b) There shall be a minimum of two access/egress routes to the helicopter landing area and these shall be as widely separated as possible. The arrangements shall be optimised to ensure that, in the event of an accident or incident on the helicopter landing area, personnel shall be able to escape upwind of the landing area. Adequacy of the emergency escape arrangements from the helicopter landing area shall be included in any evacuation, escape and rescue analysis for the vessel, and may require a third escape route to be provided.
- (c) Where foam monitors are co-located with access points, care shall be taken to ensure that no monitor is so close to an access point as to cause injury to escaping personnel by operation of the monitor in an emergency situation.
- (d) Where handrails associated with landing area access/escape points exceed the height limitations given by ICAO Annex 14, they shall be retractable, collapsible or removable. When retracted, collapsed or removed the rails shall not impede access/egress. Procedures shall be in place to retract, collapse, or remove them prior to helicopter arrival. Once the helicopter has landed, and the crew has indicated that passenger movement may commence, the handrails may be raised and locked in position. The handrails shall be retracted, collapsed, or removed again prior to the helicopter taking-off.

- (e) A Shipboard Heliport shall be provided with both a main and an emergency means of escape and access for fire fighting and rescue personnel. These shall be located as far apart from each other as is practicable and preferably on opposite sides of the Shipboard Heliport.
- (9) Environmental Effects
 - (a) The safety of helicopter flight operations can be seriously degraded by environmental effects that may be present around vessels. The term “environmental effects” describes the effects of the vessel, its systems, and forces in the surrounding environment, which result in a degraded local environment in which the helicopter is expected to operate. These environmental effects are typified by structure-induced turbulence, and turbulence/thermal effects caused by exhaust emissions. Controls in the form of landing area availability restrictions may be necessary and shall be imposed via the Aviation Inspection Body. Such restrictions can be minimised by careful attention to the design and layout of the vessel topsides and, in particular, the location of the helicopter landing area.
 - (b) All new helicopter landing areas, or modifications to existing topside arrangements which could potentially have an effect on the environmental conditions due to turbulence around an existing helicopter landing area, or helicopter landing areas where operational experience has highlighted potential airflow problems shall be subject to appropriate wind tunnel testing or Computational Fluid Dynamics (CFD) studies to establish the wind environment in which helicopters shall be expected to operate. Operations to a vessel underway where the Shipboard Heliport shall be subjected to relative rather than true wind velocity shall be taken into consideration. As a guide the standard deviation of the vertical airflow velocity shall be limited to 1.75m/s. This airflow velocity shall be applied to the recommended approach/departure path and landing/take off phase of the aircraft. The helicopter pilot/operator and Aviation Inspection Body shall be informed at the earliest opportunity of any wind conditions for which this criterion is not met in order to allow the appropriate platform availability restrictions/limitations shall be defined if necessary.
 - (c) Designers of helicopter landing areas shall commission a survey of ambient temperature rise based on a Gaussian dispersion model and supported by wind tunnel tests or CFD studies for new build helicopter landing areas, modifications to existing topside arrangements, or for helicopter landing areas where operational experience has highlighted potential thermal problems. When the results of such modelling and/or testing indicate that there may be a rise of air temperature of more than 2°C (averaged over a 3 second time interval), the helicopter pilot/operator and Aviation Inspection Body shall be consulted at the earliest opportunity so that appropriate platform availability restrictions/limitations may be applied if necessary.

H3 - Operations

- (1) HLA Operations Manual
 - (a) Each helicopter facility (including any refueling and hangar facilities) shall have an operations manual, including a description and a checklist of safety

precautions, procedures and equipment requirements. This manual may be part of the ship's emergency response procedures.

- (b) The maximum helicopter weight and 'D' value for which the helicopter landing area has been designed and the maximum size and weight of helicopter for which the vessel is certificated shall be included in the Helicopter Landing Area Operations Manual, Helicopter Landing Area Technical Certificate (where issued) and Helicopter Landing Area Certificate. The extent of the obstacle-free area shall also be stated and reference made to any helicopter landing area operating limitation imposed by helicopter operators or the Aviation Inspection Body as a result of non-compliances. Details of non-compliances themselves shall also be listed.
 - (c) The procedures and precautions shall be followed during refuelling operations shall be in accordance with recognized safe practices and contained in the operations manual.
 - (d) Fire-fighting personnel, consisting of at least two persons trained for rescue and fire-fighting duties, and fire-fighting equipment shall be immediately available at all times when helicopter operations are expected.
 - (e) On-board refresher training shall be carried out and additional supplies of fire-fighting media shall be provided for training and testing of the equipment.
- (2) Movement of HLA due to Wave Motions at Ship
- (a) Yachts experience dynamic motions due to wave action which represent a potential hazard to helicopter operations. For the helicopter operations acceleration in pitch roll and heave shall provide the limiting factor. These limits are a combination of both vessel and helicopter capability. Operational limitations based on limited pitch, roll, heave, may therefore be applied to the landing area by the Aviation Inspection Body. Helicopter landing area downtime due to excessive deck motion can be minimised by careful consideration of the location of the landing area on the vessel at the design stage. Guidance on helicopter landing area location and how to assess the impact of the resulting motion on operability is presented in UK CAA Paper 2008/03 "Helideck Landing Area Design Considerations – Environmental Effects", as may be amended from time to time and which is available on the Publications section of the UK CAA website at www.caa.co.uk. Designers of helicopter landing areas shall consult this paper at the earliest possible stage of the design process.
 - (b) The helicopter landing area shall be limited to receiving helicopters in the conditions agreed by the Aviation Inspection Body.
 - (c) It is necessary for details of pitch, roll, and heave motions shall be recorded on the vessel prior to, and during, all helicopter movements. Pitch and roll reports to helicopters shall include values, in degrees, about both axes of the true vertical datum (i.e. relative to the true horizon) and be expressed in relation to the vessel's head. Roll shall be expressed in terms of 'port' and 'starboard'; pitch shall be expressed in terms of 'up' and 'down'; heave shall be reported in a single figure, being the total heave motion of the helicopter landing area rounded up to the nearest metre. Heave shall be taken as the vertical difference between the highest and lowest points of any single cycle of the helicopter landing area

movement. The parameters reported shall be the maximum peak levels recorded during the ten minute period prior to commencement of helicopter operations.

- (d) The helicopter pilot is concerned, in order to make vital safety decisions, with the amount of 'slope' on, and the rate of movement of, the helicopter landing area surface. It is therefore important that the roll values are only related to the true vertical and do not relate to any 'false' datum (i.e. a 'list') created, for example, by anchor patterns or displacement. There are circumstances in which a pilot can be aided by amplification of the heave measurement by reference to the time period (seconds) in terms of 'peak to peak'.

(3) Aircraft Operational Data – Reporting and Recording

- (a) It is essential that yachts are provided with means of ascertaining and reporting at any time-
 - (i) The movement of the vessel to deduce 'Roll', 'Pitch', and 'Heave'.
 - (ii) the wind speed and direction using aviation approved equipment to ICAO standard;
 - (iii) the air temperature;
 - (iv) the barometric pressure using aviation approved equipment to ICAO standard;
 - (v) the visibility, cloud base and cover; and
 - (vi) the sea state.
- (b) Air temperature and barometric pressure shall be measured by conventional instruments approved to ICAO standards. An indication of wind speed and direction shall be provided visually to the pilot by the provision of a windsock coloured so as to give maximum contrast with the background. However, for recording purposes, an anemometer positioned in an unrestricted airflow is required. A second anemometer, located at a suitable height and position can give useful information on wind velocity at hover height over the helicopter landing area in the event of turbulent or deflected airflows over the deck. Visibility, cloud conditions, and sea state shall normally be assessed by visual observations.
- (c) Measuring instruments used to provide the data listed in sections 5.2.1 and 5.2.2 above shall be periodically calibrated in accordance with the manufacturer's recommendations in order to provide continuing accuracy.

(4) Support Equipment

- (a) Provision shall be made for equipment needed for use in connection with helicopter operations including-
 - (i) chocks and tie-down strops;
 - (ii) a suitable power source for starting helicopters if helicopter shut-down is seen as an operational requirement; and

- (iii) equipment for clearing the helicopter landing area of snow and ice and other contaminants.
 - (b) Chocks shall be compatible with helicopter undercarriage/wheel configurations. Helicopter operating experience has shown that the most effective chock for use on helicopter landing areas is the 'rubber triangular' or 'single piece fore and aft' type chocks may be used as long as they are suited to all helicopters likely to operate to the helicopter landing area.
 - (c) For securing helicopters to the helicopter landing area only adjustable tie-down strops shall be used.
- (5) Radio Communications Equipment
 - (a) At least one aeronautical frequency radio licensed by the Administration responsible for the airspace in which the helicopter is intended to operate when approaching the vessel shall be fitted onboard the vessel.
 - (b) Radio operators of offshore aeronautical radio stations are required to hold a Certificate of Competence. Further information can be found in CAA Publication CAP 452 'Aeronautical Radio Station Operator's Guide'.
- (6) Risk Assessment
 - (a) A full risk assessment shall be carried out addressing all the operations anticipated with helicopter operations onboard a yacht. This shall include-
 - (i) Landing and securing
 - (ii) Preparing for take off and taking off
 - (iii) Unloading passengers, baggage and stores
 - (iv) Refuelling
 - (v) Securing
 - (vi) Safe movement of personnel
 - (b) The risk assessment shall be submitted to the Administration. The risk assessment to address the safe movement of personnel on the helicopter landing area shall also be submitted for approval by the Aviation Inspection Body to demonstrate that safe passenger movement may take place without endangering the safety of the helicopter or the life of personnel on-board.
- (7) Crew Training
 - (a) All crew onboard shall undergo familiarisation training regarding helicopter operations onboard.
 - (b) Specific training shall be provided to the Helicopter Landing Officer (HLO) by an appropriate training provider. Training of crewmembers and the HLO shall include both practical and theoretical sessions and, wherever possible, practical training shall be carried out onboard.

- (c) All other crew assigned duties within the helicopter landing area operations team(s) shall be certificated as Helideck Landing Assistants (HLA) by an appropriate training provider. The training shall include dealing with fires and other possible emergency scenarios.
- (d) Where there are refuelling facilities onboard, at least one member of crew shall be trained in the handling of aviation fuel and associated quality control procedures.
- (e) The crew shall practice dealing with the possible emergency scenarios through regular drills onboard with an annual inspection by an external auditor.
- (f) The emergency scenarios shall be addressed in the yacht's contingency plans and similar documents.

H4 - Helicopter Hangar Facilities

(1) General Requirements

- (a) hangar, and maintenance facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;
- (b) enclosed hangar facilities shall be provided with mechanical ventilation, as required by Part A Section 14.1 and Part B Section 6.17(3) and ventilation fans shall be of non-sparking type;
- (c) electric equipment and wiring in enclosed hangar or enclosed spaces containing refueling installations shall also comply with the requirements of Part A Section 14.1 and Part B Section 6.15(9);
 - (i) when developing hangar arrangements, consideration shall be given to the type of fuel on which the helicopter to be stowed is run.
 - (ii) the following plans and particulars shall be submitted to the Recognised Organisation and Administration for approval-
 - (iii) hangar general arrangement and structure;
 - (iv) helicopter lift, hoist, and movement arrangements (if appropriate);
 - (v) structural fire protection;
 - (vi) fire detection and extinguishing arrangements; and
 - (vii) ventilation arrangements.
- (d) Helicopter hangar(s) onboard shall be positioned, as far as is practicable, so as to preclude excessive movement and acceleration forces. Guidance on this shall be sought from the helicopter manufacturer / operator. Where possible, the positioning of hangar(s) shall be determined through the use of computer modelling and/or wind tunnel testing (refer also to Section H2(9)(c));

- (e) If the hanger is to be accessed whilst the helicopter is stowed within it, means of escape and clearance around the helicopter for crew shall be considered, as well as any minimum clearances required for maintenance to be conducted whilst stowed.
- (f) Where appropriate CCTV shall be used to ensure visibility of the aircraft at all times.

H5 - Helicopter Re-Fuelling Facilities

(1) Introduction

- (a) This Section outlines the considerations for the storage and transfer of aviation fuel. When developing fuelling arrangements, consideration shall be given to the type of fuel on which the helicopter to be operated is run. In addition, all facilities for the storage and handling of aviation fuels onboard shall be grade identified using an appropriate industry marking for the grade of fuel used. Aviation fuel facilities shall also be fully segregated from any other fuel system.
- (b) Refuelling and defuelling systems onboard are highly specialist areas and as such, expertise shall be sought in the design of such systems which shall be to an appropriate industry standard to the satisfaction of the Aviation Inspection Body.
- (c) Refuelling and defuelling operational considerations shall be agreed with the helicopter pilot / operator and Aviation Inspection Body.
- (d) The following plans and particulars shall be submitted to the Aviation Inspection Body and Recognised Organisation for approval-
 - (i) description of fuel with statement of minimum flash point (closed cup test);
 - (ii) arrangements of fuel storage and piping;
 - (iii) arrangements for drainage, ventilation and sounding of spaces adjacent to storage tanks;
 - (iv) details and approval certification of pumping units;
 - (v) structural fire protection arrangements of all spaces to contain aviation fuel;
 - (vi) fire detection and extinguishing arrangements; and
 - (vii) ventilation arrangements.
- (e) When developing operational procedures for the movement of aviation fuel onboard, the restricted use of radio frequency equipment including portable phones with regard to transmission sparks shall be considered.

(2) General Requirements

- (a) Where the ship has helicopter refueling facilities, the following requirements shall be complied with:

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- (i) a designated area shall be provided for the storage of fuel tanks which shall be-
 - (ba) as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and
 - (bb) isolated from areas containing a source of vapour ignition.
- (ii) the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;
- (iii) tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area. Tanks may not be stored:
 - (ba) within Category A Machinery Spaces;
 - (bb) under sleeping accommodation;
 - (bc) forward of the collision bulkhead (including above the level of the Main Deck;
 - (bd) less than B/5 from the ships side;
 - (be) less than 760mm from bottom plating; and
 - (bf) adjacent to the aft end.

In the event that compliance with one or more of the above listed requirements cannot be achieved, the Administration is to be consulted via the Recognised organisation.

- (iv) fuel tanks should be:
 - (ba) designed, constructed, and certificated in accordance with an acceptable standard. This includes ASME VIII, PED 97/23/EC, BS EN 13445, and those of a Recognised Organisation;
 - (bb) constructed in stainless steel or mild steel. If mild steel is used, the interior of the tank shall be coated with an approved, fuel compatible, epoxy lining;
 - (bc) cylindrical and mounted with an obstacle free centreline slope (i.e. no baffles should be fitted) leading to a small sump or low point. This slope should be at least 1 in 30, although 1 in 25 is preferred. constructed to suitable standards;
- (v) where portable fuel storage tanks are used, special attention shall be given to-
 - (ba) design of the tank for its intended purpose;
 - (bb) mounting and securing arrangements;
 - (bc) electric bonding; and

- (bd) inspection procedures;
 - (vi) storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire and where a gravity fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;
 - (vii) the fuel pumping unit shall be connected to one tank at a time and the piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;
 - (viii) electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;
 - (ix) fuel pumping units shall incorporate a device which shall prevent over-pressurization of the delivery or filling hose;
 - (x) equipment used in refuelling operations shall be electrically bonded;
 - (xi) "NO SMOKING" signs shall be displayed at appropriate locations;
 - (xii) refuelling facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;
 - (xiii) enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by section Part A Section 14.1 and Part B 6.15(3) and ventilation fans shall be of non-sparking type; and
 - (xiv) electric equipment and wiring in enclosed spaces containing refuelling installations shall also comply with requirements of Part A Section 14.1 or Part B Section 6.17(9).
- (3) Storage and Handling Areas:
- (a) The storage and handling area shall be permanently marked. Instructions for filling fuel and, if appropriate, emptying fuel, shall be posted in the vicinity of the filling area.
- (4) Fuel Pumping and Storage Tank Filling:
- (a) In general, all piping systems shall be located clear of accommodation spaces, escape routes, embarkation stations and ventilation openings and shall not pass through category A machinery spaces. However, where arrangements are such that piping has to pass through accommodation spaces, service spaces, escape routes, or embarkation stations double skinned piping shall be used or pipes shall be enclosed in a cofferdam.
 - (b) Means shall be provided for keeping deck spills away from accommodation and service areas.

- (5) Refuelling and Defuelling Helicopters:
 - (a) Where appropriate CCTV shall be used to ensure full view from the bridge of all helicopter refuelling activities that would normally be hidden from view.
- (6) Prevention of Fuel Contamination:
 - (a) The location and arrangement of air pipes for fuel tanks shall be such that in the event of a broken vent pipe, this does not directly lead to ingress of seawater or rain water.
 - (b) At least one member of crew on-board the vessel shall be trained in the handling of aviation fuel and associated quality control procedures. This person(s) shall oversee all operations involving the movement of aviation fuel on-board. Further guidance on such training may be obtained from the fuel supplier and marine aviation consultants.
- (7) Fuel Pumping Spaces and Compartments:
 - (a) Where it is intended to install fuel transfer pumps for handling aviation fuel in a separate compartment, the pump room(s); shall be totally enclosed and have no direct communication through, e.g. bilge piping systems and ventilation systems, with machinery spaces; shall be situated adjacent to the fuel storage tanks; and shall be provided with ready means of access from the weather deck.

H6 - Other references

- (1) Guidance for landing area design considerations are given in UK Civil Aviation Authority Paper 2008/03 (as may be amended from time to time) which shall be consulted by designers of helicopter landing areas at the earliest possible stage of the design process and is available through the CAA website (www.caa.co.uk).

ANNEX I

OPERATIONAL READINESS, MAINTENANCE AND INSPECTIONS

II - Life-Saving Appliances and Arrangements

Operational Readiness

- (1) Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

Maintenance of Life Saving Appliances

- (2) Maintenance, testing and inspections of life-saving appliances shall be carried out based on the guidelines developed by the IMO¹³ and in a manner having due regard to ensuring reliability of such appliances.
- (3) Instructions for on-board maintenance of life-saving appliances complying with subsection (20) shall be provided and maintenance shall be carried out accordingly.
- (4) The Administration may accept, in compliance with the requirements of subsection (3), a shipboard planned maintenance programme, which includes the items covered in the list required in accordance with subsection (20).

Maintenance of Falls

- (5) Falls used in launching shall be inspected periodically with special regard for areas passing through sheaves, and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier.

Spares and Repair Equipment

- (6) Spares and repair equipment shall be provided for life-saving appliances and their components which are subject to excessive wear or consumption and shall be replaced regularly.

Weekly Tests and Inspections

- (7) The following tests and inspections shall be carried out weekly and a report on them shall be entered in the log-book.
- (8) all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use and the inspection shall include, but not be limited to, the condition of hooks, their attachment to the lifeboat and the confirmation that the on-load release gear has been properly and completely reset;

¹³ Refer to MSC.402(96) 'Requirements for Maintenance, Thorough Examination, Operational Testing, Overhaul and Repair of Lifeboats and Rescue Boats, Launching Appliances and Release Gear'

- (9) all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 minutes, provided the ambient temperature is above the minimum temperature required for starting and running the engine and during this period of time it shall be demonstrated that the gear box and gear box train are engaging satisfactorily;
- (10) if the special characteristics of an outboard motor fitted to a rescue boat would not allow it to be run for a period of 3 minutes other than with its propeller submerged, a suitable water supply may be provided; and
- (11) the general emergency alarm shall be tested.

Monthly Tests and Inspections

- (12) The following tests and inspections shall be carried out monthly and a report on them shall be entered in the log-book-
 - (a) all lifeboats, except free-fall lifeboats, shall be turned out from their stowed position, without any persons onboard, if weather and sea conditions so allow; and
 - (b) inspection of the life-saving appliances, including lifeboat equipment, shall be carried out using the checklist required by subsection (20)(a) to ensure that they are complete and in good order.

Servicing of Life Saving Appliances and Systems

- (13) Every inflatable liferaft, inflatable lifejacket, marine evacuation system shall be serviced-
 - (a) at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months; and
 - (b) at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel¹⁴.
 - (c) All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the ship; however, permanent repairs shall be effected at an approved servicing station
- (14) An Administration which approves new and novel inflatable liferaft arrangements pursuant to section 7.2 may allow for extended service intervals on the following conditions-
 - (a) the new and novel liferaft arrangement has proved to maintain the same standard, as required by testing procedure, during extended service intervals.
 - (b) the liferaft system shall be checked onboard by certified personnel at intervals set out in subsection (13)(a).

¹⁴ Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts, adopted by the IMO by Resolution A.761(18).

- (c) service at intervals not exceeding five years shall be carried out in accordance with the recommendations of the IMO¹⁵.
- (15) An Administration which permits extension of liferaft service intervals in accordance with subsection (14) shall notify the IMO of such action in accordance with SOLAS I/5(b).
- (16) All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions; emergency repairs may be carried out onboard the ship; however, permanent repairs shall be effected at an approved servicing station.

Servicing of Life Saving Appliances and Systems

- (17) Hydrostatic release units, other than disposable hydrostatic release units, shall be serviced-
 - (a) at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months¹⁶; and
 - (b) at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

Periodic Servicing of Launching Appliances and on-Load Release Gear

- (18) Launching appliances shall be-
 - (a) maintained in accordance with instructions for on-board maintenance as required by subsection (20).
 - (b) subject to a thorough examination at the annual surveys required by SOLAS I/7 or 8, as applicable; and
 - (c) upon completion of the examination referred to in paragraph (b) above, subjected to a dynamic test of the winch brake at maximum lowering speed and the load to be applied shall be the mass of the survival craft or rescue boat without persons onboard, provided that, at intervals not exceeding five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.
- (19) Lifeboat or rescue boat on-load release gear shall be-
 - (a) maintained in accordance with instructions for on-board maintenance as required by subsection (20);
 - (b) subject to a thorough examination and operational test during the annual surveys required by SOLAS I/7 or 8, as applicable; and

¹⁵ Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts, adopted by the IMO by Resolution A.761(18). Account shall also be taken of the service period for the equipment recommended by the manufacturer.

¹⁶ Refer to MSC/Circ.955, Servicing of life-saving appliances and Radiocommunication equipment under the harmonized system of survey and certification (HSSC).

- (c) operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment whenever the release gear is overhauled provided that such over-hauling and tests shall be carried out at least once every five years¹⁷.

Instructions for on-board maintenance

- (20) Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance-
 - (a) a checklist for use when carrying out the inspections required by subsection (12)(b);
 - (b) maintenance and repair instructions;
 - (c) a schedule of periodic maintenance;
 - (d) a diagram of lubrication points with the recommended lubricants;
 - (e) a list of replaceable parts;
 - (f) a list of sources of spare parts; and
 - (g) a log for records of inspections and maintenance.

Rotational Deployment of Marine Evacuation Systems

- (21) In addition to or in conjunction with the servicing intervals of marine evacuation systems required by subsection (9), each marine evacuation system shall be deployed¹⁸ from the ship on a rotational basis at intervals shall be agreed by the Administration provided that each system shall be deployed at least once every six years.

Marking of Stowage Locations

- (22) Containers, brackets, racks, and other similar stowage locations for life-saving equipment, shall be marked with symbols in accordance with the recommendations of the IMO¹⁹, indicating the devices stowed in that location for that purpose and where more than one device is stowed in that location, the number of devices shall also be indicated.

¹⁷ Refer to the Recommendation on testing of life-saving appliances, adopted by the IMO by resolution A.689(17). For life-saving appliances installed onboard on or after 1 July 1999, refer to the Revised Recommendations on testing of life-saving appliances, adopted by the IMO by resolution MSC.81(70)

¹⁸ Results of MES rotational deployments shall be reported to the Administration as per MGN 558 (M) Life-Saving Appliances - Marine Evacuation Systems (MES) - Servicing and Deployments

¹⁹ Refer to the Symbols related to life-saving appliances and arrangements, adopted by the IMO by Resolution A.760(18).

I2 - Construction - Fire protection, fire detection and fire extinction

Purpose

- (1) The purpose of this paragraph is to maintain and monitor the effectiveness of the fire safety measures the ship is provided with. For this purpose, the following functional requirements shall be met-
 - (a) fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and
 - (b) fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

General Requirements

- (2) At all times while the ship is in service, the requirements of Annex C shall be complied with and a ship is not in service when-
 - (a) it is in for repairs or lay-up (either at anchor or in port) or in dry-dock; or
 - (b) it is declared not in service by the owner or the owner's representative;
- (3) The following fire protection systems shall be kept in good order so as to ensure their required performance if a fire occurs-
 - (a) structural fire protection, including fire-resisting divisions, and protection of openings and penetrations in these divisions;
 - (b) fire detection and fire alarm systems; and
 - (c) means of escape systems and appliances.
- (4) Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use. Portable extinguishers which have been discharged shall be immediately recharged or replaced with an equivalent unit.
- (5) Maintenance, testing and inspections shall be carried out based on the guidelines developed by the IMO²⁰ and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.
- (6) The maintenance plan shall be kept onboard the ship and shall be available for inspection whenever required by the Administration.
- (7) The maintenance plan which may be computer based shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed-

²⁰ Refer to the revised guidelines for the on maintenance and inspection of fire protection systems and appliances (MSC.1/ Circ1432).

- (a) fire mains, fire pumps and hydrants, including hoses, nozzles and international shore connections;
- (b) fixed fire detection and fire alarm systems;
- (c) fixed fire-extinguishing systems and other fire-extinguishing appliances;
- (d) automatic sprinkler, fire detection and fire alarm systems;
- (e) ventilation systems, including fire and smoke dampers, fans and their controls;
- (f) emergency shutdown of fuel supply;
- (g) fire doors, including their controls;
- (h) general emergency alarm systems;
- (i) emergency escape breathing devices;
- (j) portable fire extinguishers, including spare charges; and
- (k) firefighter's outfits.

ANNEX J

MEDICAL CARE AND CARRIAGE OF MEDICAL STORES

J1 - Medical Care for Seafarers:

- (1) The requirements for onboard health and medical care set out in this Annex include standards for measures aimed at providing seafarers with health protection and medical care as comparable as possible to that which is generally available to workers ashore.
- (2) The health protection and medical care shall in principle be provided at no cost to the seafarers.
- (3) The employer and master shall ensure that all seafarers are covered by adequate measures providing for health protection and medical care, including essential dental and optical care which-
 - (a) ensure the application to seafarers of any general provisions on occupational health protection and medical care relevant to their duties, as well as special provisions specific to work onboard ship;
 - (b) give seafarers the right to visit a qualified medical doctor or dentist without delay in ports of call, where practicable;
 - (c) ensure that seafarers are given health protection and medical care as comparable as possible to that which is generally available to workers ashore, including prompt access to the necessary medicines, medical equipment and facilities for diagnosis and treatment and to medical information and expertise;
 - (d) give seafarers the right to visit a qualified medical doctor or dentist without delay in ports of call, where practicable;
 - (e) are not limited to treatment of sick or injured seafarers but include measures of a preventative character such as health promotion and health education programmes; and
 - (f) minimise the risk of infection and ensure appropriate preventative measures such as immunisation are taken.

J2 - Provision of On-board Medical Care:

- (1) The carriage of medical stores and equipment as provided for in this Annex is designed to provide an appropriate level of primary care for all persons onboard pending, where necessary, the provision of shore based medical services.

J3 - Medical Cabinet:

- (1) A cabinet or other suitable facility for storing medicines and other medical stores shall be provided and the cabinet, shall be well ventilated and fitted in a place in the crew area of the ship which is-
 - (a) always dry;
 - (b) readily accessible from (but not sited in) the permanent or temporary hospital; and
 - (c) not subject to abnormal heat.
- (2) The medical cabinet shall be provided with the following-
 - (a) an outer door with an efficient lock;
 - (b) where controlled drugs shall be stored, an inner cupboard fitted with a door and a lock which cannot be opened by the same key as the lock to the outer door;
 - (c) suitable arrangements for the storage of the medicines, medical stores and associated measuring devices; and
 - (d) a dispensing counter with a surface that can be easily kept clean.
- (3) The medical cabinet shall be lit by an electric light (which may be inside or immediately outside it) which enables the contents to be clearly seen.

J4 - Carriage of Medical Stores:

- (1) The ship shall carry onboard medical stores and equipment as specified by the Administration.

J5 - Standards of Medical Stores:

- (1) All medical stores required to be kept onboard ship shall conform to the standards and requirements of the British National Formulary, the British Pharmacopoeia, the European Pharmacopoeia, or the United States Pharmacopoeia, and/or with the requirements and specifications of the Administration.

J6 - Carriage of Medical Guides:

- (1) The ship shall carry guides as to the use of medical stores specified in section 13.3 including in particular instructions for the use of antidotes.

J7 - Medical Advice:

- (1) All ships shall carry a complete and up-to-date list of radio stations through which medical advice can be obtained; and if equipped with a system of satellite communication, carry an up-to-date and complete list of coast earth stations through which medical advice can be obtained. Seafarers with responsibility for medical care or

medical first aid onboard shall be instructed in the use of the ship's medical guide and the medical section of the most recent edition of the International Code of Signals so as to enable them to understand the type of information needed by the advising doctor as well as the advice received.

J8 - Inspection of Medicines and Medical Stores:

- (1) The medicine chest and its contents, as well as the medical equipment and medical guide carried onboard, shall be properly maintained and inspected at regular intervals, not exceeding 12 months, by a competent person or authority, who shall ensure that the labelling, expiry dates and conditions of storage of all medicines and directions for their use are checked and all equipment functioning as required.

J9 - Carriage of Doctors or Medically Trained Personnel:

- (1) Ships carrying 100 or more persons and undertaking international voyages in excess of 600 miles shall carry a qualified medical doctor who is responsible for providing medical care.
- (2) In yachts not required to carry a doctor the master shall ensure that any medical attention or treatment administered onboard to any person is given either by the master or under his supervision by a person so appointed by him for the purpose provided that the person so appointed shall have received medical training to an appropriate level in accordance with the STCW.

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ANNEX K

SHIP-SHORE TRANSFER OF PERSONNEL

K1 - Tenders

- (1) When a vessel carries a rigid or inflatable tender, it shall be fit for its intended use, regularly inspected by the owner/managing agent, and maintained in a safe condition.
- (2) Safety equipment shall be provided in the tender as appropriate to its intended range and area of operation.
- (3) Each tender shall be clearly marked with the number of persons (mass 75 kilograms) that it can safely carry, and the name of the parent vessel.
- (4) In the case of petrol-engined tenders, operation shall be in accordance with the manufacturer's instructions with due consideration to the safety requirements for the carriage of petrol contained in each part of the Code.
- (5) Where more than 12 passengers are carried by the tenders, the IMO guidelines for passenger ship tenders MSC.1/Circ.1417 shall be followed.
- (6) All tenders, when fitted with remote throttle controls, shall be fitted with a kill-cord, to be used at all times during navigation. A spare kill cord shall also be carried on board.

K2 - Pilot Boarding Arrangements:

- (1) Boarding arrangements provided for pilots shall have due regard for SOLAS V/23 and IMO Resolution A1045(27) "Pilot transfer arrangements", International Maritime Pilots' Association (IMPA) recommendations, or any documents replacing them taking into consideration any national requirements.
- (2) In lieu of compliance with SOLAS V/23.3.3.4 regarding 15 degree angles of list only, Pilot Ladders which are sufficiently long enough for use in the Arrival Condition plus 5 degrees of list or the final angle of equilibrium in the damaged condition, whichever is the most onerous may be accepted. Due regard shall be paid to ensuring that a suitable means of securing the ladder at intermediate lengths is provided.

K3 - Gangways, Passerelles, and Accommodation Ladders

- (1) A safe means of access shall be provided at all times when in port, either deployed or available for deployment. If the safe means of access is not deployed, there shall be a means provided for communication between those on the quay and those onboard and in all circumstances a safe means of access shall be provided for any persons embarking or disembarking on the ship.
- (2) Access equipment and immediate approaches to it shall be adequately illuminated.

- (3) Equipment used to provide access shall also meet the standards or requirements set out in international standards²¹ and applicable national legislation.
- (4) When provided, gangways, passerelles, and accommodation ladders shall be manufactured to a recognised national or international standard, and be clearly marked with the manufacturer's name, the model number, the maximum design angle of use and the maximum safe loading (by number of persons and by total weight). Side screens or handrail(s) shall be provided on both sides and shall comply with one of the following options:-
 - (a) Where handrails are provided these shall be supported by stanchions at intervals of not more than 2200mm. Intermediate rails or wires shall also be provided. The opening below the lowest course of the Intermediate rails or wires shall not exceed 230 mm. The other courses shall be not more than 380 mm; or
 - (b) Intermediate rails and toe boards (which may be portable) are to be provided in accordance with ISO 7061:2015, Figure 1 – General Arrangement of a Gangway Type A.
- (5) Where gangways, passerelles or ladders do not comply with national or international standards, a manufacturer's test load certificate shall be provided. Alternatively, practical tests may be carried out to the satisfaction of the Administration. In all cases the maximum design angle, maximum number of persons, and the maximum total weight shall be clearly marked, and shall be used in accordance with the manufacturer's instructions. Side screens or handrail(s) shall be provided on both sides and shall comply with one of the following options:-
 - (a) Where handrails are provided these shall be supported by stanchions at intervals of not more than 1500mm. Intermediate rails or wires shall also be provided. The opening below the lowest course of the Intermediate rails or wires shall not exceed 230 mm. The other courses shall be not more than 380 mm; or
 - (b) Intermediate rails and toe boards (which may be portable) are to be provided in accordance with ISO 7061:2015, Figure 1 – General Arrangement of a Gangway Type A.
- (6) Access equipment and immediate approaches to it shall be adequately illuminated.
- (7) Reference standards include:
 - BSMA 78:1978 - Gangways (excluding the maximum overall widths specified in table 2); and
 - BSMA 89:1980 - Accommodation Ladders;
 - ISO 7061:1993 - Shipbuilding - Aluminium shore gangways for seagoing vessels;
 - ISO 5488:1979 - Shipbuilding - Accommodation ladders.

²¹ Refer to MSC.1/Circular.1331, Guidelines for construction, installation, maintenance and inspection/survey of means of embarkation and disembarkation.

K4 - Submersible Craft

- (1) Submersible Craft carried on yachts shall comply with the standards of the Administration as well as:
 - (a) they shall be constructed and maintained in accordance with the rules of a Recognised Organisation, applicable national regulations and be suitable for the intended use;
 - (b) supporting equipment shall be constructed and maintained in accordance with the rules of the Recognised Organisation responsible for certifying the submersible, as well as any applicable national regulations. The maximum safe working load of the equipment and maximum sea state in which the craft may be launched shall be stated;
 - (c) a safety management system which may be separate from any system operated by the parent vessel, including an operations manual, shall be in place, and subject to annual audit;
 - (d) following satisfactory survey and audit, certification for safety of submersible craft and its support equipment shall be issued, and is subject to annual survey;
 - (e) maintenance shall be carried out by the manufacturer or an organisation or person accepted by the Administration at intervals specified by the manufacture; and
 - (f) operating crew to have adequate theoretical and practical training for the type of submersible craft onboard, and have demonstrated ability to operate it.

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ANNEX L

APPLICATION OF INTERNATIONAL CONVENTIONS AND NATIONAL LEGISLATION

L1 - Conventions - General:

- (1) Every vessel to which this Code applies shall comply with the relevant provisions of other applicable Conventions (as amended), Guidelines and Recommendations published by the IMO, including but not necessarily limited to this Annex, to the extent to which it is applied by the Administration.

L2 - COLREGs

- (1) Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREG);
 - (a) Navigation lights and shapes shall comply with the applicable provisions of COLREG, including the following provisions-
 - (i) all navigation lights shall be provided with main and emergency power supply;
 - (ii) all navigation lights required to be shown whilst underway are required to be duplicated in accordance with IMO Resolution MSC.253(83)²² as may be amended from time to time; and
 - (iii) approved LED Lights may be used providing the lights meet the technical specifications of COLREG.

L3 - Prevention of Pollution (MARPOL)

- (1) Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended (MARPOL);
 - (a) Vessels shall comply with all the requirements of MARPOL as prescribed by the regulations of the Administration. For vessels under 400GT it is the owner's responsibility to comply with local Administration/port state requirements and for dealing with oily bilge water retention etc.
 - (b) Every ship of 100GT and above, and every ship which is certified to carry 15 persons or more, shall carry a garbage management plan which shall include the written procedures agreed for collection, storage, processing and disposal of garbage; and a garbage record book recording disposal and incineration, as outlined in regulation 9 of Annex V of MARPOL.

²² See MSC.253(83) - Adoption of the Performance Standards for Navigation Lights, Navigation Light Controllers and Associated Equipment - (Adopted on 8 October 2007).

- (c) Special local requirements may exist in national sea areas, ports and harbours. The attention of owners/operators is drawn to the need to comply with local requirements as appropriate.

L4 - Anti-fouling Convention

- (1) Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, as amended (AFS 2001);

- (a) This Convention applies to every ship of 400GT and above
- (b) For EU flagged vessels exceeding 24m in length but less than 400GT regulation (EC) No 782/2003 on the prohibition of organotin compounds on ships states-

"Ships of 24 metres or more in length, but less than 400GT, shall carry an AFS-Declaration to demonstrate compliance."

L5 - Ballast Water Management Convention

- (1) Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended (BWM 2004);

- (a) Vessels that use water for ballasting purposes are required to be compliant with the BWM Convention for which the application of which shall be confirmed within the Convention itself.

L6 - Bunkers Convention:

- (1) Convention on Civil Liability for Bunker Oil Pollution Damage, 2001

- (a) Ships of 1000GT and above are required to carry an appropriate level of insurance covering liability for costs arising from pollution damage following a bunker oil spill from the ship.
- (b) As evidence that adequate insurance cover is in place the owner or operator of the ship is required to carry a Certificate to this effect issued by the Administration.
- (c) The Administration shall issue such a Bunkers Certificate only where it is satisfied that the insurance cover provided is acceptable.

L7 - Nairobi Convention

- (1) Wreck Removal Insurance.

- (a) Ships of 300 gross tonnage and above are required to carry an appropriate level of insurance covering liability for costs arising from the costs of wreck removal.
- (b) As evidence that adequate insurance cover is in place the owner or operator of the ship is required to carry a Certificate to this effect issued by the Administration.

- (c) The Administration will issue such a Wreck Removal Convention Certificate only where it is satisfied that the insurance cover provided is acceptable.

L8 - The Maritime Labour Convention, 2006 (MLC)

- (1) Relevant Conventions of the International Labour Organisation (ILO), including but not necessarily limited to The Maritime Labour Convention, 2006 (ILO)

L9 - The Polar Code

- (1) Safety Measures for Ships Operating in Polar Waters (The Polar Code)
 - (a) This Sub-Section applies to ships operating in polar waters, from 1 January 2017 as per SOLAS XIV and the Polar Code.
 - (b) Ships constructed before 1 January 2017 shall meet the relevant requirements of SOLAS XIV and the Polar Code by the first intermediate or renewal survey, whichever occurs first, after 1 January 2018.
 - (c) Every ship to which this Sub-section applies shall have onboard a valid Polar Ship Certificate

L10 - Ships using low-flashpoint fuels:

- (1) The International Code of safety for ships using gases or other low-flashpoint fuels (IGF) Code shall apply to ships using low-flashpoint fuels:
 - (a) for which the building contract is placed on or after 1 January 2017;
 - (b) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or
 - (c) the delivery of which is on or after 1 January 2021

L11 - Health And Safety

- (1) In addition to any national legislation applicable, working practices shall take account of the United Kingdom “Code of Safe Working Practices for Merchant Seafarers”, as may be amended from time to time.

L12 - National Legislation:

- (1) In applying the provisions of the Code due regard shall be taken of any applicable national legislation of the Administration concerned.

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ANNEX M

LIST OF CERTIFICATES TO BE ISSUED

M1 - General

- (1) Every vessel to which this Code applies shall be certificated on accordance with the relevant provisions of the applicable Conventions (as amended). This shall include as a guide, but not necessarily limited to those listed in this Annex.

M2 - Certificates to be issued to all vessels:

- (1) Certificate of British Registry
- (2) International Tonnage Certificate
- (3) REG Yacht Code Certificate
- (4) Certificate of Classification
- (5) International Load Line Certificate
- (6) Load Line Conditions of Assignment
- (7) Certificate or Statement of Sewage Pollution Prevention (when more than 15 persons are carried onboard)
- (8) Minimum Safe Manning Document
- (9) Antifouling Systems, Owners Declaration (<400GT)
- (10) EIAPP Cert. / NOx Tech. Files (for each engine >130KW built after 1st January 2000)
- (11) Ship Station Radio License
- (12) International Ballast Water Management Certificate/Statement (if applicable)

M3 - Additional certificates to be issued to vessels of 300 GT and over

- (1) Safety Radio Certificate and Form R (Part A vessels only)
- (2) Wreck Removal Convention Certificate (Nairobi Convention)

M4 - Additional certificates to be issued to vessels of 400 GT and over

- (1) International Oil Pollution Prevention Certificate and Record
- (2) International Air Pollution Prevention Certificate/Statement and Record

- (3) International Energy Efficiency Certificate/Statement
- (4) Antifouling Systems Certificate/Statement (Class Declaration) (>400GT)

M5 - Additional certificates to be issued to vessels of 500 GT and over

- (1) Safety Construction Certificate (Part A vessels only)
- (2) Safety Equipment Certificate (Part A vessels only)
- (3) ISM Safety Management Certificate
- (4) International Ship Security Certificate
- (5) Continuous Synopsis Record file
- (6) Maritime Labour Convention (MLC) Certificate (including DMLC I and DMLC II)

M6 - Additional certificates to be issued to vessels of 1000 GT and over

- (1) Civil Liability Certificate for Bunker Oil Pollution Damage (Bunkers Convention)

M7 - Additional certificates to be issued to Part B Vessels

- (1) Passenger (Yacht) Ship Safety Certificate and Form P
- (2) Statement of Operational Limitations

ANNEX N

SURVEY, CERTIFICATION AND ACCIDENT INVESTIGATIONS

N1 - General

- (1) All vessels covered by this code are required to be surveyed and certificated in accordance with the applicable international conventions and national legislation (See Annex L).
- (2) Statutory work may be undertaken by surveyors of the Administration or by surveyors of a Recognised Organisation appointed by the Administration.
- (3) A vessel to which the International Conventions apply shall be surveyed and, if the necessary standards are met, Convention certificates shall be issued. All requests for survey and certification shall be made to the Administration.

N2 - Survey and Certification:

- (1) All ships covered by this Code are required to be surveyed and certified in accordance with the applicable requirements of the survey guidelines under the IMO Harmonized System of Survey and Certification adopted by resolution A.1053(27) as applicable to:
 - (a) passenger ships carrying not more than 36 passengers for Part B vessels
 - (b) cargo ships for Part A vessels

N3 - Use of a Recognised Organisation

- (1) Statutory work may be undertaken by surveyors of the Administration or by surveyors of a Recognised Organisation appointed by the Administration. All requests for survey and certification shall be made to the Administration or the appropriate Recognised Organisation where such surveys are delegated.
- (2) An authorised Recognised Organisation is aware of the extent to which responsibility has been delegated to issue Load Line Certificates and Cargo Ship Safety Construction Certificates. International Conventions give specific discretion to an Administration to either make exemptions or accept equivalent equipment or arrangements. The formal agreement between the Administration and an authorised Recognised Organisation governs the relationship between the two parties.

N4 - Use of a Recognised Organisation Surveyor to act on the behalf of the Administration

- (1) An exclusive surveyor from a Recognised Organisation and proposed by the Society may be appointed from time to time to act on behalf of the Administration in cases

when it is impracticable for a surveyor of the Administration to make the visit necessary for the survey.

- (2) When a Recognised Organisation surveyor is so appointed, actions taken shall be under direct instruction of the Administration. The Administration shall provide the appointed surveyor with detailed guidance on the scope of survey and report required.

N5 - Accident Investigations

- (1) The Administration with which the vessel is registered is obliged to investigate certain accidents or incidents in accordance with the requirements of International Conventions. In addition to this requirement, an Administration may investigate any incidents where there may be important safety lessons to be learned.
- (2) It may be an offence for the vessel's master, skipper or owner not to inform the appropriate authority of a reportable accident shortly after it occurs and to provide details so that an assessment of its seriousness can be made quickly. The Administration shall appoint a suitable inspector whenever an investigation is required. The Administration will receive the Inspector's report of the investigation and shall deal with the follow up action.
- (3) The Administration has a duty to conduct an investigation into any very serious marine casualty occurring on any ships to which the IMO Casualty Investigation Code applies. Such an investigation may assist in determining what changes in the content of this code may be desirable. Casualty investigations are carried out in accordance with the IMO Casualty Investigation Code²³ and any applicable national legislation of the Administration concerned.
- (4) All very serious marine casualties in accordance with the IMO definition are reported to IMO through the Administration.

²³ The full title of the Casualty Investigation Code is "Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Incident".

ANNEX O

PROTECTION OF PERSONNEL

01 - Safe Work Aloft, Over-side, and on the Bowsprit of Sailing Vessels

- (1) When access to the rig, bowsprit, or over-side working is required, provision shall be made to enable people to work safely, in accordance with recognised national or international standards.
- (2) The arrangements provided for accessing rigging shall be based on established safe working practices for the type of vessel. The arrangements may include but not be limited to:
 - (a) safety nets below the bowsprit;
 - (b) safety grab rails or jackstays (metal or wire) fixed along the bowsprit to act as handholds and strong points for safety harnesses;
 - (c) mandatory use of safety harnesses aloft, over-side, and for work on the bowsprit;
 - (d) sufficient footropes and horses in wire (or rope) permanently rigged to enable seafarers to stand on them whilst working out on the yards or on the bowsprit;
 - (e) safety jackstays (metal or wire) fixed along the top of the yards, to provide handholds and act as strong points for safety harnesses;
 - (f) means of safely climbing aloft, such as:
 - (i) fixed metal steps or ladders attached to the mast; or
 - (ii) traditional ratlines (rope) or, rattling bars (wood/steel), fixed across the shrouds to form a permanent ladder.
- (3) Safe means of external access to all parts of the vessel shall be made available where crew are expected to work through Over-side Working Systems in accordance with Annex B.
- (4) Equipment manufacturers of Over-side Working Systems and ship builder instructions and guidance on their installation, use, maintenance, inspection and testing shall be followed at all times.
- (5) The mast and other spaces requiring access via ladders shall include continuous fall protection measures to protect personnel when ascending or descending ladders.
- (6) New vessels shall have “External Access Plans” showing locations and loads for all elements of the Over-side Working Systems in accordance with Annex B approved by a Recognised Organisation.

O2 - Personal Clothing

- (1) It shall be the responsibility of the Company/Master to advise that the following requirements for items of personal clothing shall be met:
 - (a) Each person onboard a vessel shall have protective clothing appropriate to the prevailing air and sea temperatures.
 - (b) Each person onboard a vessel shall have footwear having non-slip soles, to be worn onboard.

O3 - Lifts

- (1) Personnel lift installations shall be appropriately designed and constructed, installed and tested by a competent person.
- (2) Designs shall be submitted at an early stage of construction. Recognised international standards such as BS EN 81 shall be considered but the following gives a minimum standard that shall be provided:
 - (a) For vessels of 500 GT and above structural fire protection requires lift shaft within an “A” class division as per section 14B.2.6. Where the lift shaft is fitted within a stairway enclosure there is no need for “A” class divisions between the lift and the staircase;
 - (b) Construction and installation for marine use shall be supported by a certificate from a Recognised Organisation or manufacturer and include a relevant load test;
 - (c) Lift shall comprise an enclosed capsule;
 - (d) A suitable means of escape from the capsule and lift shaft shall be provided;
 - (e) Mains and emergency power to be provided, where necessary to comply with item (d);
 - (f) Emergency lighting to be provided;
 - (g) An internal alarm and telephone to be provided;
 - (h) Normal operation shall ensure lift only stops at each deck; and
 - (i) “Not to be used in case of fire” sign shall be posted within.
- (3) Reference standards include:
 - (a) BS EN 81 series – Safety rules for the construction and installation of lifts
 - (b) BS 5655 series – Lifts and service lifts

O4 - Man-riding cranes

Design

- (1) In order for deck cranes or other lifting appliances, other than those covered by Part A Chapter 13 & Part B Chapter 7, to be man-riding as per Chapter 2 definitions, they shall be certified as such through compliance with a recognised national or international standard to the satisfaction of the Administration.

Testing and Maintenance

- (2) Annual and 5 Yearly Testing and maintenance of man-riding cranes shall be in accordance with original manufactures instructions

Operations

- (3) Operations of the man-riding cranes and other lifting appliances shall:
 - (a) be in accordance with the original equipment manufacturer's operating instructions
 - (b) be within any restrictions set by the original equipment manufacturer or Recognised Organisation approving the equipment
 - (c) Operating instructions shall be posted locally to any controls along with any restrictions as per O.4(3)(b).

